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USSR Report

CONSTRUCTION AND RELATED INDUSTRIES

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Construction and Related Industries

Contents

GOSPLAN OFFICIAL ON CONSTRUCTION TECHNOLOGY

Moscow IZVESTIYA in Russian 22 Sep 84 p 2

[Article by L. Bibin, first deputy chairman, USSR Gosplan: "Better Equipment for Construction Projects"]

[Text] Conversations have been going on for a long time about the pace and quality of capital construction. For the sake of fairness it should be noted that the criticism has had some effect, and this year the builders have improved their work. There has been an increase in the volume of contract-type work; in many organizations there has been a certain increase in the growth rate of labor productivity and the profitability of construction. And some major projects have been finished ahead of the intended deadlines thanks to the introduction of the achievements of construction science, new equipment, as well as advanced methods of organizing labor and production.

But, despite a certain amount of progress on the whole and great successes of individual groups, the state of affairs in capital construction is still far from satisfactory and, as before, gives cause for serious concern. Considerable funds, for example, are scattered about on numerous projects, and, as a result of this, their structural readiness is only half that of the norm. There are instances where construction costs have been increased and the quality of the work is poor.

Of course, these shortcomings depend, to a considerable degree, on the builders themselves. This is testified to very clearly by the discussion which has now developed over the letter which the construction-brigade leaders sent to PRAVDA, and with regard to which a decree of the CPSU Central Committee has been adopted. Much is explained by the fact that the developmental level of the material-technical base and industrialization of construction, although it has risen very greatly during recent decades, still does not meet the requirements of the tasks which have been assigned to the builders.

This was spoken about at the conference held in the CPSU Central Committee; the subject of discussion was the proposal by Comrade K. U. Chernenko, in which he also specified measures to aid this sector. At the present time USSR Gosplan, in conjunction with the organizations concerned, is preparing concrete positions with regard to increasing labor productivity in construction, based on retooling it. It should be noted that the solution to this problem depends on many branches of the national economy. Satisfying the needs of the construction organizations for up-to-date machinery, power tools, and hand tools is a very large and serious problem.

In general, there is enough equipment at the construction sites today. They have sufficient machinery for carrying out almost all the earth-moving and loading-and-unloading operations, for erecting buildings and structures made of large-size reinforced-concrete elements and big blocks. In housing construction, what are functioning are, in essence, home-building conveyors, where the basic processes, beginning with the production of the parts of the future houses and extending to the finishing operations, are performed with the aid of machines.

Construction of mainline petroleum- and gas-pipelines, as well as the principal railroad and automotive highways, is carried out by large-scale complexes and flow-lines and, thanks to the high degree of mechanization, is proceeding at a pace which is unprecedented up to this time.

The principal producer and supplier of machinery is the Ministry of Construction, Road and Municipal Machine Building. During the last few years most of the excavator plants, for example, have mastered the production of up-to-date hydraulic, fully rotating machines. Truck-mounted cranes with a small load-hoisting capacity are gradually being replaced by mobile hydraulic cranes with movable booms, capable of lifting as much as 40 tons. Earth-moving machines have been created with automatic control; the production of plastering and painting stations has been organized with complete sets of the necessary tools and attachments.

The All-Union Scientific Research Institute for Construction-and-Installation Tools of the Ministry of Construction, Road and Municipal Machine Building has developed and put into production power tools and hand tools in an extensive products list; their design and quality meet the present-day requirements. The vibration-persussion tool, for example, with respect to safeguarding the worker from the harmful effect of vibration considerably exceeds the level of foreign models.

Nevertheless, the creators of equipment are still "in debt" to the builders, approximately half of whom are still working manually. Along with some very good equipment, the enterprises of the Ministry of Construction, Road and Municipal Machine Building are turning out obsolete models. It is quite often the case that even up-to-date machines pass out through the shop gate unsuitable for use. For example, the Ministry of Construction in the Far East and Transbaykal Regions received a batch of tower cranes from the Rustavskiy Plant of the Ministry of Construction, Road and Municipal Machine Building and could not put them into operation for four months--so badly had they been manufactured and assembled. Nor have complaints ceased coming in from builders about the poor quality of the truck-mounted concrete pumps from the Tuymazinsk Plant. And finally--an old problem of all enterprises building machines for construction--too little specialized equipment for work in the Far North, comfortable working conditions have not been created for people--no protection from dust, noise, heat, or cold.

The level of mechanization for loading-and-unloading as well as auxiliary operations at the sites is still too low. Among the problems still unsolved by the ministry must be included the acute shortage of universal loaders with a hoisting capacity ranging from three to fifteen tons and rapidly removable operating organs, mobile cranes mounted on truck-type chassis with a hoisting capacity of 25,000--100,000 tons, small-sized, universal construction machines with engines having a capacity of 15--35 horsepower, with an extensive set of replaceable equipment with which practically every general-construction brigade ought to be supplied.

While criticizing the machine builders for all this, we are also correct in addressing part of our complaints to USSR Gosstroy, which should determine policy in the production of construction equipment but so far has been extremely tentative in doing so. With the active participation of the ministries and departments, USSR Gosplan is now developing a draft plan for the Targeted Comprehensive Program for Reducing Manual Labor in the Country during the Years 1985--1990 and for the Period until the Year 2000; it will have a section pertaining to construction. The registration of occupations and types of work which has already been conducted during the course of this work has shown that manual labor today has been retained primarily in masonry, plastering, painting, installation, and loading-and-unloading operations. In order to increase labor productivity, the builders are lacking, for example, sufficient, suitable hand and power tools. And they themselves are partly to blame for this. In due course a decree was adopted regarding the construction or expansion of 13 tool plants. But only four of them are in operation today.

In solving the problem of construction equipment far from complete use is being made of the possibilities of socialist economic integration. Production specialization and cooperation among the CEMA member countries yields much greater fruits in motor-vehicle manufacture, instrument manufacture, and other sectors of industry than in construction and road machine building. Although individual examples testify to much. Let's say, for example, that Polish enterprises supply the Ministry of Construction, Road and Municipal Machine Building with special chassis of the motor-vehicle type for mobile cranes with a load-hoisting capacity of 25 and 40 tons. Bulgaria's industry sends a large number of electric motors for power tools. The GDR exports to the USSR single-bucket excavators, crawler-mounted cranes, and earth-compacting equipment. In close cooperation with Hungary's plants, airless-sprayer painting units are produced.

Consultations with the planning organs of the CEMA member countries have shown, however, that there are possibilities for significantly expanding the production and delivery of construction equipment. Thus, the Czechoslovak experts informed us that there could be an increase in the production and delivery to the USSR of universal, loaders equipped with pneumatic tires, hydraulic-type, single-bucket excavators, scrapers with elevator loading, vibration-type rollers, universal construction machinery with small capacities for earth-moving and loading operations, as well as power tools. Analogous proposals have come in from the other CEMA member countries. At the present time they are being studied, as are also the models of the equipment.

In creating construction machinery far from the last role is played by the builders themselves. World practice confirms the feasibility of producing small-sized series of special machines in the sphere of construction production. A small-sized series does not at all mean that a "home-made,"poorly designed and poor-quality machine is being turned out. For example, the USSR Ministry of Power and Electrification supplies heavy tower cranes with a load-hoisting capacity of 25--50 tons not only for the construction of hydroelectric and nuclear-power stations but also exports cranes to construction projects abroad.

General-construction ministries considerably earlier than the Ministry of Construction, Road and Municipal Machine Building began to make plastering and painting stations, freight-and-passenger elevators, installations for supplying stiff-mix concretes, and a great deal of other construction equipment. Quite a

few up-to-date machines are being turned out by the Ministry of Construction of Petroleum and Gas Industry Enterprises. And so it is likewise feasible to further expand the production of means of mechanization at the enterprises of the construction ministries and make fuller use of the capacities existing in construction.

It should, however, be noted that the problems of further mechanizing construction cannot be solved by the extensive method, solely by means of saturation with equipment. The skillful and effective use of the enormous pool of machines and equipment has become one of the basic tasks of organizing construction production.

Today equipment is not always and not everywhere being utilized in an economical manner. Excavators, bulldozers, and truck-mounted cranes in many construction organizations are operating no more than 10 hours a day. For such a bad-management attitude toward expensive machinery it is necessary to blame, above all, the first-line supervisors of the construction process--the foremen, the operational chiefs, and the section chiefs. It is precisely on their experience and know-how that the operational productivity of the equipment depends.

The constantly increasing pool of machinery in construction needs a high-capacity repair and operational service. The specialized trusts of mechanization, which account for about 60 percent of the large-scale construction equipment, already have difficulties in coping with its repair. In recent years the contract-type construction ministries have practically ceased building repair enterprises. The rate of turning out spare parts is lagging behind the amount of equipment being produced. At the same time the machines are becoming more and more complicated, and their repairs must be carried out at specialized enterprises.

Machine builders must actively participate in restoring construction equipment. It is obviously high time that we organize the repair of the most complicated machinery at the specialized plants under the jurisdiction of the Ministry of Construction, Road and Municipal Machine Building. The practice of having the manufacturing department handle the equipment repair has spoken well for itself throughout the world, and it yields a solid economic effect.

Implementing measures with regard to retooling construction requires time, and the results will be felt only at the end of the 12th Five-Year Plan. Even now, however, we are right in demanding from builders a better utilization of the existing production potential. Because over a nine-month period less than half of the projects most important for the national economyhave been put into operation. So that the tension of the last few start-up months of the year does not effect the quality and costs of construction, we must use the existing construction machinery in an economical, rational manner, achieve a greater yield from it, introduce advanced working methods, brigade-type contracts, and strictly observe the plans for organizing construction and operational production.

But the most important and determining factor for the fate of the year program is to concentrate as much as possible efforts and means on the start-up construction projects of 1984. This pertains to all the participants in production --the contractors, customers, planners, and suppliers of equipment and materials.

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ADVANCES IN CONSTRUCTION TECHNOLOGY OUTLINED

Moscow PROMYSHLENNOYE STROITEL'STVO in Russian No 8, Aug 84, pp 2-5

[Article by I. A. Ganichev, deputy chairman of USSR Gosstroy: "Principal Trends in Scientific and Technical Progress in the Area of Organization, Technology, and Mechanization of Industrial Construction"]

[Text] The CPSU Central Committee and USSR Council of Ministers' decree "Concerning an Improvement in Planning, Organizing and Managing Capital Construction" noted that the development of capital construction and transforming it into a large industrial sector of the country's national economy is a subject of constant attention by the Communist Party and Soviet government. More than 3,200 industrial enterprises and also housing units with a total area of more than 1.3 billion square meters were built and put into operation during the 9th, 10th and 3 years of the 11th Five-Year Plans. The volume of construction and installation work almost doubled during this time.

Completely prefabricated construction amounted to more than 40 percent of the program for the primary construction ministries. The proportion of efficient types of steel in metal components amounted to more than 20 percent. Prestressed components make up about one fourth of all the prefabricated reinforced concrete today.

Nonetheless, as was noted in the resolutions of the 25th CPSU Congress and the subsequent plenums of the CPSU Central Committee, there are quite a few unresolved problems in capital construction. The plans for putting capacities and projects into operation are not being met, the duration of construction for enterprises and structures is substantially higher than the norm. Deficiencies in planning, design and estimate work, and in organizing and managing capital construction have not been eliminated. The responsibility of client-ministries, their associations and enterprises and also construction ministries for meeting the goals for putting capacities and projects into operation, effectively using capital investments, and for improving financial and economic indicators in construction is lax. The dispersion of capital investments among a multitude of construction projects is permitted, above-normal volumes of incomplete construction are still great in a number of sectors, and the scale of work to reconstruct and technically retool

production is inadequate. Labor productivity in construction is growing at a slow pace, the principles of cost accounting are being adopted poorly, many construction and installation organizations operate unprofitably. and there exists instances of poor quality of construction and installation work being done.

A fundamental improvement in capital construction affairs is in urgent demand today. This goal can be solved only on the basis of further industrialization, comprehensive engineering preparations for construction, an improvement in organizational and management forms, economic incentives, and adopting the brigade form of organizing labor.

The task of fundamentally improving capital investment planning and providing balanced plans has become especially urgent for construction ministries and client-ministries. Solving the problem is directly associated with unharnessing key economic factors and incentives and making them effective including capital formation, the credit and financing system, and methods of evaluating economic activity. The institutes in USSR Gosstroy and most of all the Institute of Construction Economics have still not done all they can about these problems.

A complete package of organizational measures consumes less capital and is more important in its effect. First of all the role of the plans for organizing construction must be sharply increased which are directive documents on a level with the technical design that regulate the organization and technology of construction production.

Technical design work itself must also be fundamentally changed. The general design organization or, by its request, an organization in a construction ministry must, as a rule, work out the scheme for producing work for all complicated projects and large industrial complexes from funds for design and research work; it must coordinate it with the client, general contractor, and subcontractor construction organizations.

The task of decisively converting to advanced methods of construction lies before builders. The practice of recent years confirms that by means of the centralized method alone the duration of construction is reduced by 5 to 7 percent while labor productivity increases by a factor of 1.2 to 1.5.

The completely modular method of erecting buildings is among those that have long-range importance. The essence of it is to completely deliver modular units of technological equipment, structural, structural-technological and utility units to construction that are completely factory finished and to rapidly assemble them at the construction site. However, due to a lack of specialized construction industry bases today the composite assembly of construction components and technological equipment in modular sections is done primarily at construction sites or directly near them without the required technological equipment and with large labor expenditures while the basic theory of the completely modular method of transferring labor expenditures from the construction site to stationary conditions remains unrealized.

Developing the completely modular method ad expanding the area of its use is being hindered by the lack of a normative and methodological basis that would regulate the problems in planning and designing projects in completely modular form, organizing complete deliveries of construction components and technological equipment, and forming a specialized production base and the means of transporting modular units. The NIIES [Scientific Research Institute of the Economics of Construction], the TsNIIOMTP [Central Scientific Research Institute for the Organization, Mechanization and Technical Assistance of Construction], institutes in the USSR Ministry of Installation and Special Construction, and construction ministries must direct their efforts toward solving these problems.

It is necessary to prepare a list of projects, buildings, portions of buildings, and engineering and technological equipment in the near future with the corresponding technical and technical-economic justifications which would be advisable to redesign and manufacture in the form of modular units. A strategic program for converting to a completely modular method of construction should be drawn up. There should be no delay in this matter nor is a simplistic method justifiable. The very process of design work requires coordination work among a great number of organizations under various departmental jurisdictions. The structural use of the constructed portion of buildings and mechanical and technological equipment has to be substantially changed.

One should keep in mind that the completely modular method of construction requires substantial up-front capital investments and therefore the selection of projects that will be done first and the subsequent plans for converting construction to the above method must be economically justified.

Due to the completely modular method the duration of construction is reduced by a factor of 1.2 to 1.5 and labor expenditures are reduced by 10 to 12 man-years for each million rubles of construction and installation work.

The problem of organizing mobile construction organizations first of all in regions that do not have a sufficiently developed construction base is on the agenda at this particular stage in developing production forces.

In the near future construction ministries must coordinate the regions of activity for mobile organizations with USSR Gosplan and USSR Gossnab by considering the expansion, reconstruction, and technological retooling of operating bases and the formation of new rear support bases for supplying construction with materials and technology.

Institutes in USSR Gosstroy, especially NIIES and TsNIIOMTP, must make recommendations to construction ministries based on a list of mobile organizations, their specialization and material and technological equipment, a table of the level of mechanization that is optimum for each area or the regional operating radius. It is necessary for construction ministries to equip mobile construction and installation organizations with the highly productive machines, mechanisms, tools, means of transportation, and movable

production, housing and everyday buildings which can be assembled and dismantled that are now lacking during the course of 1984 and 1985.

In accordance with the above-mentioned decree by the CPSU Central Committee and USSR Council of Ministers, USSR Gosplan and USSR Gossnab will meet the demands of construction ministries to equip mobile organizations. But it is important that the fixed assets of these organizations become operational as soon as possible and with the greatest return. Construction ministry agencies, main administrations, scientific research institutes, agencies for the organization and technology of construction, and the scientific community must be included in the problem.

USSR Gosstroy is planning to review the existing normative technical documentation on construction organization and technology in 1984 and 1985 in order to establish more rigid obligatory requirements for improving engineering preparations, increasing technological discipline, extensively using flow methods and advanced technology in construction production, and improving the organization of workers' labor.

The CPSU Central Committee and USSR Council of Ministers' decree specifies that the technical expertise which was acquired by organizations in the Main Central Ural Construction Administration under the USSR Ministry of Construction of Heavy Industry Enterprises, the Main Central Volga Construction Administration in the USSR Ministry of Industrial Construction, the Main Western Construction Administration in the USSR Ministry of Construction, and also the BSSR Ministry of Industrial Construction and BSSR Ministry of Rural Construction be implemented to build and turn over in a "turnkey fashion" a number of industrial projects, housing units and projects for social and general purposes based on designs and estimates approved by the client and contractor. This expertise assumes an increase in responsibility for all the links in the investment cycle of all organizations. The role of planners is sharply increased. In the final analysis success at all stages of construction will depend on the quality of the design and estimate documents. The point is not just about issuing documents on time but also about carrying out a purposeful technological policy, the essence of which is to reduce expenditures for all types of resources most of all at the construction site, and to further industrialize construction.

The main goal of industrialization is to substantially increase production volumes and the use of state-of-the-art components, parts, products, modular and large-scale components and units, built-in facilities, mechanical equipment systems for buildings, transportation networks, underground structures, transformer and pumping stations, boiler installations, elevator shaft ad other fully modular components that are completely factory-ready, which are on a high technical and qualitative level and correspond to the latest achievements of science and up-to-date practices. During the course of 1985 and the 12th Five-Year Plan construction ministries and client-ministries must complete the subsequent conversion to the massive use of large-scale construction and technological components and units with assembled technological equipment that are delivered from machine-building plants or specialized bases that provide complete equipment.

It is necessary to ensure that the conveyor assembly and large modular unit installation of the roofs of industrial buildings, and the complete modular installation of built-in facilities, transportation tunnels, modular electromechanical equipment units, and highly industrialized methods of installing mechanical and utility networks be extensively adopted. The efforts of workers in scientific research and design organizations in ministry and department agencies must be directed toward solving this problem.

Construction ministries and departments must sharply improve the quality of the construction parts and components that are turned out at enterprises that are under their jurisdiction. The further technological retooling and reconstruction of enterprises in the construction industry and building materials industry, and equipping them with modern highly productive technological equipment, automated systems, robots and manipulators remains to be done. The primary goal is to transfer the center where the workload is concentrated from the construction site to enterprise shops. This, naturally, requires certain additional capital investments but attention should first of all be focused on existing personal untapped potentials.

Before the end of the current five-year plan scientific research and design institutes in USSR Gosstroy and construction ministries must compile a list of parts and components in production, housing, civil, mechanical and auxiliary buildings and structures that should be converted to being manufactured under factory conditions in the form of standard products, components, modular units, and completely modular installations and buildings. On the basis of this list ministries and departments should work out standardized products and components, modular units, and completely modular installations, as well as typical built-in facilities and typical designs for buildings and structures for mechanical and auxiliary purposes that are in modular units, organize their production under factory conditions, and deliver them to the construction site as a unit with all technological and mechanical equipment, devices and piping in the shortest period of time.

The construction industrialization program cannot be successfully completed without construction materials and products being supplied as a complete unit including bracing, adhesive, hermetic sealing, packing, priming, spackling and other aids and materials in a packaged form.

In 1984 and 1985 the USSR Ministry of Construction of Heavy Industry Enterprises, the USSR Ministry of Construction, the Ministry of Eastern Construction, the USSR Ministry of Rural Construction, and the USSR Ministry of Power and Electrification must organize two or three centralized areas at operating enterprises for producing standardized parts for fastening construction components and mechanical and utility lines and also components, products and parts for auxiliary purposes in each of the following economic regions: the Northwest, Central, along the Volga, the Urals, Western Siberia, Eastern Siberia, the Far East, Kazakhstan, Central Asia, and the Caucasus, and also in the Ukraine and other regions where there is a concentration of construction.

The problems in producing concrete work must be solved on a new technological and organizational basis.

It is necessary to form regional reinforcing plants in 1984 to 1986 (by means of specialization and cooperation between operating shops) and to organize at these plants the centralized production of standardized reinforcing items and insert pieces with a limited amount of types for precast and monolithic reinforced concrete components that are used on a mass scale, and for USSR Gosstroy to ensure that standards are worked out in 1985 for standardized reinforcing items and insert pieces. A goal has been set of completely mechanizing the delivery and placement of concrete mixtures with the aid of concrete mixer trucks and carriers, hydraulic concrete pumps, and belt concrete placers.

It should be noted that builders are not satisfactorily using the available fleet of highly productive technology. If the estimated utilized productivity of concrete mixer trucks, carriers, pumps and other technology had been reached everywhere then the goal for growth in labor productivity for the 11th Five-Year Plan would have been reached more successfully.

Placing auxiliary and cast concrete mixtures with superplasticizers in building components makes it possible to reduce labor expenditures at the construction site, and improve labor productivity and working conditions.

The total proportion of concrete placed by special concrete placing units can amount to 10 to 15 percent depending on the delivery of superplasticizers which can free approximately 1000 people per year.

The industrialization of formwork has a significant effect on reducing labor expenditures with a very small amount of capital investments. Construction ministries must establish specific plans for manufacturing complete inventories of forms, goals for the volume of use of such forms, and goals for reducing labor and material resources.

Improving the technology of concrete work is impossible without a change in the organization of work. The technical level of the means of mechanization and the organizational forms are essentially contradictory today. In a directive letter in 1982 USSR Gosstroy suggested that construction ministries and departments organize specialized subdivisions for doing concrete work based on a subcontract. But such subdivisions have so far only been organized in territorial administrations in the USSR Ministry on Construction.

A constrained method of setting, automated installation, and fastening components into the designed location is being used in civil construction during construction and installation work. Specialists in TsNII [Scientific Research Institute] for Industrial Buildings, and TsNIIOMTP must work out new structural approaches to the areas that bear the loads of the components.

The use of extruded asbestos cement panels when installinng enclosure components (exterior walls, roofs and partitions) makes it possible to improve the quality of components, reduce the weight of buildings, and provide a

savings in labor expenditures in comparison with traditional components. TsNIIOMTP and other organizations have developed efficient technology for installing enclosure components made of extruded asbestos cement panels which includes a preliminary coarse assembly and also a complete line of technological rigging, equipment, and tools that make it possible to completely mechanize the process of installing enclosure components and reduce the cost of labor and installation.

The technology of installing enclosure components made from extruded asbestos cement panels and the complete line of technological rigging, equipment, and tools will make it possible to tentatively reduce labor expenditures by 62.5 man-days and the cost per 1000 square meters of enclosure components by 1050 rubles.

Replacing welded connections with bolts in metal components has much potential for reducing expenses. The introduction of technology for making connections between steel components, mechanical and utility lines, and also components, products and parts of an auxiliary nature by using state-of-the-art bracket pieces will make it possible to substantially reduce labor expenditures.

As before overall finish and roofing operations remain the most labor intensive. Transferring a portion of the roofing work to the plant shop increases the degree at which the panels are factory-ready and reduces labor expenditures at the construction site. The manufacture and use of complete roof panels for projects will make it possible to reduce labor expenditures and free a large number of workers.

The general trend in the technology of roofing work during the 12th Five-Year Plan will continue to be an expansion in the volume of fused ruberoid that is used. When using fused ruberoid, labor productivity is greater by a factor of 1.8 to 2 than when using standard ruberoid on glue adhesives. The need for a complete line of large roofing machinery becomes unnecessary including cauldrons to heat bitumen and prepare hot adhesives, pipelines, motorized asphalt spreaders, and adhesive conveyors. When laying down roofs made of fused ruberoid labor expenditures are reduced and workers freed. Converting to the uncomplicated technology of gluing on fused ruberoid does not require capital investments by the construction ministries. Converting to film-like materials that possess qualities of high efficiency is an even more advanced approach.

The general trend in the area of finish work is toward "dry" methods of finishing using sheet and laminated materials. But attention should still be given to the problems of industrializing finish work that is done by traditional methods. Using a single layer of plaster from mixtures that are prepared in a central location and mortars made from dry mixtures of lime and a cement adhesive with addition of polymer substances reduces labor expenditures by a factor of 20 to 25 percent and improves the quality of the plastered surfaces. Producing plaster work using mortars prepared from dry gypsum mixtures improves the quality of plaster surfaces, reduces labor expenditures at the construction site and the duration of time to complete the work. The use of gypsum binding agents that mix evenly by themselves makes it

possible to improve labor productivity by a factor of 2 to 2.5 in comparison with the application of binding agents from strictly cement and sand mortars.

One of the primary potentials for sharply reducing manual labor is the mechanization and automation of technological and auxiliary processes and operations through the use of manipulators, robots, and means of automation. Replacing physically difficult, harmful, dangerous and monotonous work through the use of these new types of machines makes it possible to take a qualitative leap in construction labor productivity. The role of automation in production processes is increasing as the most important factor in the modern technological process, a powerful means of increasing productivity and improving working conditions. As experience shows, the use of automated excavating machines improves the quality of the work performed as well as labor productivity, lightens the workload of operating engineers, and provides a savings in fuel and lubricant materials.

TsNIIOMTP has worked out a list of processes that should be first in line to be automated or computerized through robots. The main goal at the current stage is to implement the plans for automation, develop technical means, create reliable systems for using automated means and efficiently service them.

Production organizations should give more attention to the problem of delivering construction cargos. At the present time the relative proportion of construction cargos that are delivered in containers or packages of the total cargo volume amounts to only 5 percent. The adoption of delivering cargos that are in containers or packages will make it possible to create the conditions for completely mechanizing loading, unloading and warehouse work, reduce labor consumption, the cost of transportation operations, and reduce expenses for packaging materials and operations, eliminate losses of transported cargos and protect materials and products. The delivery of cargos in containers and packages is especially efficient on motor vehicle means of transportation that have loading and unloading devices. When these are used the idle time of motor vehicle means of transportation are reduced when loading and unloading, their productivity increases, and expenses for loading and unloading operations are reduced. The time that the installation crane is engaged in basic work is increased which leads to a reduction in the duration of erecting buildings and structures.

The economic effect from adopting a system of delivering construction cargos in containers and packages on motor vehicle means of transportation having loading and unloading devices amounts to an average of 30,000 rubles per vehicle per year.

The principal reasons that are hindering the extensive adoption of the new system of delivering cargo is the lack of a complete line of products for manufacturing specialized motor vehicle means of transportation with selfloading devices, the lack of serial production of containers and specialized motor vehicle means of transportation having loading and unloading devices and a lack of coordination between the participants delivering the cargos.

The CPSU Central Committee and USSR Council of Ministers, with particular urgency, set a goal for builders to economize all types of resources in every way possible. Meeting it involves improving technological discipline in all areas of construction production, and adopting and using new machines, mechanisms, equipment, tools, and rigging more efficiently. Construction ministries must ensure that the centralization of basic machinery and minor means of mechanization in specialized mechanization subdivisions (trusts, mechanization administrations, and minor means of mechanization administrations) is completed, that the role and responsibility of these organizations in carrying out the complete mechanization and automation of construction work is increased, and that labor expenditures are reduced.

It is necessary to begin to form specialized technical services for installing, fine-tuning, and operating automated systems and to completely staff them with qualified specialists and workers.

The task remains of further developing the centralized capital repair of construction machines and trucks, centralizing repair work and making it more specialized, developing means of rehabilitating worn out parts and repairing machine assemblies at mechanical repair shops, and ensuring that the amount of repair work that is done by the forces in construction and installation organizations is reduced.

The CPSU Central Committee and USSR Council of Ministers have approved the suggestions by a number of ministries to single out examples in construction and installation organizations and also in construction industry enterprises that use new techniques, advanced technology, and completely mechanized construction, that save material resources, ensure high productivity, labor practices, and quality of work, and that adopt domestic and foreign expertise in producing work.

The goal of rendering continual technical assistance to the model construction and installation organizations stands before workers in the scientific research organizations headed by TsNIIOMTP and administrations for the organization and technology of construction in construction ministries. The point is that construction subdivisions be efficiently equipped, that the optimum management structure be formed by taking into consideration specific local conditions, that an uninterrupted growth in the return on investments be ensured, and that a program for increasng the industrialization of construction based on a five-year period be worked out that ensures a growth in labor productivity that substantially surpasses the average indicators for the sector. The scientific and technical community must orient their work to the maximum degree possible toward forming a network of model construction and installation organizations during the first stage and then toward extending the positive expertise to each main territorial administration in construction.

Meeting the planned goals for growth in labor productivity and reducing expenditures for material and energy resources requires continual organizational work in the labor collectives. Measures for achieving the

specific technical and economic indicators should be outlined in each construction organization and crew.

Construction production workers and workers in design and scientific research organizations will take all measures to completely and successfully meet the goals that were promoted by the CPSU Central Committee and USSR Council of Ministers and the goals of the state plan for the economic and social development of the USSR.

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PROCEDURE FOR CAPITAL CONSTRUCTION LOANS TIGHTENED

Moscow FINANSY SSSR in Russian No 11, Nov 84 pp 41-44

[Article by I. A. Boklogov, director of Cherkassy Oblast office of USSR Stroybank, and Candidate of Economic Sciences V. I. Makodzeba, deputy chief accountant of Cherkassy Production Association Azot]

[Text] Improving the monitoring of the use of equipment issued by clients for installation, under modern conditions of the intensification of construction and an increase of the volumes of capital investments, acquires important significance. This means reliable determination of the degree of fulfillment of the plan of investments in equipment and the remaining spare equipment for correct crediting for construction projects of industry and the institutions of the financing bank. An increase of the relative significance of the active part of basic funds, which is especially typical for construction projects of heavy industry, contributes to an increase of the return of capital investments. The significance of monitoring the fulfillment of deadlines for turnover of equipment for installation and setting it up increases in this regard.

The efforts of construction and installation organizations should be concentrated in preparation and fulfillment of all jobs that provide for setting up equipment within the deadline at the corresponding stage of construction. Accordingly, one can judge the completeness of all preceding work on the part of contractors and fulfillment of the pledges of clients with respect to contract agreements according to the beginning installation. The same is true with fulfillment of the plan for completion of the installation of equipment and operations on individual testing of it in neutral environments.

It is important to emphasize the different times of achievement of specific tasks in fulfillment of the named operations: the beginning of installation of equipment, completion of its installation and individual tests. This different time level is fixed in the statistical accounting on fulfillment of the planning indicators: of the capital investments in equipment in the first case and of the volume of installation work on setting it up and testing in the second case. The first indicator is reflected in accounting only of clients, while the second is reflected in the accounting of contractors and clients.

Instruction No 190/6, confirmed by TsSU SSSR [USSR Central Statistical Administration] on 22 December 1980, on the procedure for compilation of statistical accounting for capital construction provides that the estimated cost of equipment requiring installation be included in the fulfilled volumes of capital investments from the month in which work on setting it up or consolidated assembly of the parts of the equipment, subject to payment according to the price fees for installation of it, actually begins. The basis for inclusion in the fulfilled volumes of capital investments are form No 3 or an inventory report of uncompleted production of work on a standard interdepartmental primary documentation form (form No KS-7), formulated in established order. The instruction determines that the estimated cost of the completed work on installation of equipment is included in form No 3 only for the equipment or its assemblies for which installation is complete (see items Nos 6.11 and 6.7, respectively).

Form No 3 is now designed to reflect only completed volumes of construction and installation work for uncompleted facilities and complexes. Therefore, it is unacceptable to record the beginning of installation of equipment for inclusion in the fulfilled volumes of capital investments. The corresponding requisites are not even provided in it.

The inventory report of uncompleted production of construction and installation work--form No KS-7, confirmed by the USSR Central Statistical Administration on 14 Dec 1972, also does not contain the requisites required to record the names, specifications, amount, quality and completeness of equipment, the dates of issue and the numbers of the expense documents for delivery of it to contractors from client warehouses. Column No 1 in the report of form No KS-7 is the only one in which there can be text notations, but it is intended to record facilities under construction, structural elements and types or consolidated phases of work.

It is also important to bear in mind other operations not provided by the mentioned instructions, for example, a surplus of equipment and monitoring and measuring instruments received by contractors at the stage of incomplete delivery of assemblies for industrial methods of installation, check assembly and checking on the stands of specialized organizations and enterprises. These states, like completion of the operations themselves, cannot be reflected in the reports of form No KS-7 and, accordingly, in accounting and bookkeeping, which would contribute to determination of the real location of items by inventory upon determination of the volumes of investments in equipment.

For example, the process of installation of equipment both by norms and the actually installed equipment is rather prolonged in construction of facilities of the chemical industry. Moreover, an enormous amount of equipment of different name, without mentioning the specifications, can be installed simultaneously. To record it in the form of reports, recommended for inventory, form No KS-7 must be considerably supplemented with many requisites that characterize the quantitative-qualitative and cost indicators of equipment. We feel that this is inefficient due to the extreme information overload, since the primary document will not correspond to its direct designation and will essentially be unadaptable for use in inventory of equipment for which installation was begun.

It is obvious that the given and other factors already had a negative effect on accounting data on fulfillment of the plan of capital investments, warehouse reserves and accordingly in the correctness of calculations of crediting equipment. Thus, for construction projects alone, financed by the Cherkassy Oblast office of USSR Stroybank, the excess volumes of capital investments in equipment by 255,000 rubles was determined by control measurements for 1982-1983, for which punitive sanctions were applied by the office. A surplus credit for equipment worth a considerable sum was established due to reserves of equipment, incorrectly indicated in the reports of the construction projects, as a result of errors in inventory during installation, for which bank sanctions were also imposed.

However, matters cannot be corrected by sanctions alone. Moreover, control measurements are unable to achieve their goal and do not reveal the causes that give rise to the additions, unreliability of accounting data and violations in crediting of equipment. It is best to solve the problem in this situation by using primary documents more suitable for this purpose, in which only specific information required for a check on the part of clients, bank institutions and contractors, rather than multipurpose and superfluous information. Not only the participants of the investment process gain, but this is primarily in the interests of the state.

It is stated in the recommendations outlined in letter No 124 of the Technical Administration of USSR Stroybank, dated 11 June 1980: "On the procedure for conducting control measurements for equipment turned over for installation": "A separate inventory report of incomplete production," which is the basis for including the cost of the given equipment or a part of it in the fulfilled volume of capital investments, is compiled for equipment turned over for installation." The same thing is stated in the standard departmental form No KS-7, sent to offices by the Technical Administration of USSR Stroybank in letter No 142, dated 16 August 1976, to supplement instructions No 7, dated 14 January 1972 "On procedures for conducting control measurements of construction and installation work by USSR Stroybank." We feel that such a complicated problem of bringing order to inventory of equipment in the stage of installation at industrial construction sites cannot be solved in this manner. This is especially true at large heavy industry construction projects, where thousands of units of different types and designation of equipment worth several million rubles is turned over monthly for installation.

The search for a way out of the established situation made it necessary to conduct experiments at the Cherkassy PO [production association] Azot imeni Komsomol Ukrainy. Main attention was devoted here to document formulation of the equipment issued for installation, setup of which was not begun for each date under review. The results of the experiments were generalized and everything positive was later introduced as an experiment at a number of large construction projects of the sector. This experiment has been under way for more than 6 years in the association.

The situation of the procedure of reflecting the equipment re-issued to contractors in the bookkeeping accounts was taken as a basis. It reads in the existing instructions: "Equipment turned over to the contractor, installation

and setup of which at a permanent operating site have actually not begun, is not removed from the account of the builder (client), but is only recalculated from subaccount 07-3 or 07-4 to a separate subaccount 'Equipment in installation zone on account of installation organization.'"* A local form of the equipment inventory report, installation of which has not begun, was worked out for document reflection of the given operation on bookkeeping subaccounts.

The given reports became important primary documents in information content that provide control over the commercial mass of equipment, short-term bank credits, deadlines for repayment of them or assurance of funds for subsequent repayment of credits for imported equipment and also to guarantee the preservation of equipment during installation. Therefore, special attention is devoted to formulation of them. They are compiled by permanently acting bilateral commissions of the client and contractor and are confirmed by their management. Data on the location of installation of equipment according to the project (facility or number of the building), the name and brief specifications, the unit of measurement, the amount, cost according to actual and estimated prices and the numbers and dates of expense documents for turnover of equipment from client warehouses are indicated in the inventory reports. All these data are of important significance to control.

Tying the notations in the inventory reports to expense documents makes it possible to exercise operative control over installation of the equipment issued to contractors so as to follow fulfillment of the installation schedules and the course of construction of facilities, on the one hand, and so as to provide correct evaluation of equipment and determination of its cost expression for accounting and statistical reporting on fulfillment of the plan, on the other hand. Expense documents--reports of form No M-25 khim**--contain all necessary information, including the scheduled deadline for turnover of equipment according to each item on the basis of the schedule--appendices to intrasite title lists of form No 1--and according to contract agreements. If these deadlines are not observed, the established deadline of crediting of the equipment is taken. A column for recording the date of putting the equipment turned over into operation according to the numbers of the report in the working acceptance committees is allocated in reports of form No M-25 khim.

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* "Plan schetov bukhgalterskogo ucheta proizvodstvenno-khozyaystvennoy deyatel'nosti predpriyatiy, stroyek i khozyaystvennykh organizatsiy i instruktsiya po yego primeneniyu" [Plan of Accounts for Production-Economic Activity of Enterprises, Construction Projects and Management Organizations and Instructions on Use of It], Moscow, Izdatel'stvo "Finansy", 1970, 52 pages.

** The report for turnover of equipment for installation--form No M-25 khim--is a standardized form for accounting for imported equipment used according to Sector instructions on accounting for imported equipment and materials of complete deliveries at enterprises of the chemical industry, confirmed on 8 June 1979. The universal nature of this form made it quite acceptable for accounting for equipment of Soviet production and control.

The extensive and specific information load of reports of form No M-25 khim permits them to be used not only as a primary document, but also as a record of analytical operative accounting. The conditions for which each warehouse manager is obligated at the end of the working day to turn over four copies of the mentioned report to the makeup department of the construction project with the signature of the contractor on the actual turnover of equipment to him for installation are provided by intramanagement instructions in this regard. The copies of the reports are then grouped by facilities. The corresponding notations are made in them at the end of the month under review on those items of equipment which were entered in the inventory report as installation not begun.

Reliability of integrated inventory data is thus achieved and the laboriousness of document formulation is repeatedly reduced. There is thus no need to rewrite all the equipment, installation of which was begun, toward which the instructions of the Central Statistical Administration and USSR Stroybank are oriented. The monthly volume of this equipment, compared to that which is not in the stage of setup and installation, comprises an average of more than two-thirds at construction projects of the chemical industry. In order not to commit errors, all equipment issued during the month is checked by a commission at the installation site. The more there is manual work in formulation of the notations, the greater the probability of errors. Therefore, a check in the installation zone, during assembly and in makeup of equipment turned over to contractors is made in four copies of form No M-25 khim. But a check can also be made by reports of standard from No M-25.

The many years of positive experience of equipment inventory, setup and installation of which were not begun, provides a basis according to the local form of the report to recognize objectively its advantages compared to report of form No KS-7. The proposed form of the inventory report showed during practical use of it that it permits the best concentration and multiple use of the information recorded in primary documents. We feel that not only all clients and contractors, but institutions of the financing bank and even organizations of the USSR Central Statistical Administration will also be interested in this information.

We feel that the main thing is to regulate the different times of document reflection of fulfillment of the planning indicators on installation work of installed equipment and capital investments in it. Fulfillment of the plan of investments in equipment according to completion of it and conducting of individual tests, as is provided for fulfillment of the planned volumes of work on installation of equipment, rather than according to the beginning of installation (securing to the footing, other load-bearing structures or consolidated assembly of its parts) can be assumed in regulation. Simultaneous document reflection of completion of scheduled events, a clear realistic pattern of their completion in the stage of transition to multiple testing, startup and adjustment permit more reliable determination and recording of the fulfillment of planning indicators and characterization of the created active part of basic production funds.

It should be emphasized that the main indicator in planning and evaluation of the activity of clients and contractors from the primary sections to ministries is now introduction of production capacities and basic funds into operation, prepared for product output and rendering services. Achievement of this indicator is preceded by fulfillment of many different operations provided by projects, norms and regulations. The greater part of these operations are now related to the sphere of capital construction by existing instructions of USSR Gosstroy and other organizations. The remaining (startup-adjusting operations) are ascribed to the main production activity, although they complete the investment process and are inseparable in their nature from recovery of basic funds.

Gradual conversion to construction and turnover of facilities and "turnkey" plants induces an objective need for completion of all operations during a single investment process--from design to introduction of created basic funds into operation. Experiments and new investigations in construction show the objective need to include starting-adjustment operations in the sphere of capital construction and to include its final stage in the sphere of multiple testing of equipment and bringing it to a stable operating mode.

There cannot but be significant changes in cost analysis of the volumes of fulfillment of the plan of investments in equipment and in bringing order to determination of them in this regard. The stages of completion of installation, multiple testing of equipment, startup and adjustment of it and readiness for introduction into operation and turnover for operation will be determined more specifically in accounting and statistical reporting. But there will undoubtedly be a constant need to take inventory of equipment during installation to record its readiness at intermediate stages. And the proposed method of inventory also does not lose its significance under these conditions.

6521
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GREATER ACCOUNTABILITY FROM CONSTRUCTION LOAN APPLICANTS

Moscow FINANSY SSSR in Russian No 11, Nov 84 pp 44-45

[Article by T. A. Abakumova, manager of KOMI Republic office of USSR Stroybank, V. I. Frolov, senior scientific associate of LenTNILOES, and engineer M. F. Luk'yanov, LenTNILOES]

[Text] The role of credit has increased signficantly in the sphere of capital construction as a result of implementation of measures provided by the decree of the CPSU Central Committee and the USSR Council of Ministers "On improvement of planning and intensification of the effectiveness of the economic mechanism on increasing production efficiency and work quality." Introduction of the economic activity of calculations for the commercial construction product into practice, replacement of advances of clients by bank credits and further differentiation of percentage rates for credit made it possible to a significant degree to direct the efforts of all construction participants toward achievement of its final results. These measures led to stabilization of the scope of uncompleted construction production and of concentration of resources on the most important starting facilities.

The work of contract construction organizations under modern conditions assumes efficient use of both their own and of outside financial resources. At the same time, the effectiveness of using their own circulating funds and credit is still insufficiently high. Moreover, a specific reduction of the indicators that reflect this level is observed throughout capital construction as a whole.

This situation has been established primarily due to the extremely unstable financial condition of many construction organizations. As practice shows, significant payments at increased rates for credit have a considerable influence on profits and on the profitability of contract organizations. These payments in turn frequently occur for reasons independent of the contractor. In many cases clients who do not fulfill contract pledges and who bear very limited material responsibility for this, and also superior planning organizations are guilty. For example, Bumpromstroy Trust [possibly Construction Trust for Pulp and Paper Industry] of the Komityazhstroy Association [possibly Komi Heavy Construction Association] paid increased percentages of 841,000 rubles (55-60 percent through the fault of the client) to Stroybank during 1981-1983.

Taking into account that the influence of a contract construction organization on a client is very limited due to the different departmental affiliation and system of evaluating their activity, further improvement of bank influence in the "general contractor-client" system is necessary. The order of accumulation of funds, released by the client with regard to abolition of advances, requires development and refinement. As is known, one of the basic principles of crediting in the USSR is that of direct credit, i.e., the absence of any intermediaries between the bank and borrower. With the existing crediting system, the given principle is disrupted due to the dependence of the bank offering funds to the contractor due to fulfillment of the plan of fund accumulation by the client.

The practice of economic activity shows that the crediting of contract organizations for the planned volume of construction and installation work must be continuous, without regard to the client's fulfilling the plan of introducing his own funds, both locally and on a centralized basis. This crediting should be carried out by accumulation of funds throughout the Stroybank office as a whole that provides the financing or at the expense of a superior organization of the corresponding office of USSR Stroybank. But punitive sanctions would then have to be levied against the client in the form of an increased percentage rate for credit issued to the contracting organization.

The problem of crediting facilities that have not been provided on a timely basis with design-estimate documentation is difficult for builders. These facilities are not financed, do not participate in crediting and no loans are made on them. Nevertheless, work is usually carried out on them since these are planned facilities. The procedure of crediting in which the expenditures of the contracting organization on transitory and newly begun planned facilities in the absence of design-estimate documentation due to review or reconfirmation are applied to crediting, but an increased percentage is levied from the contractor, could be tested as an experiment. At the same time, the client is fined at the rate of 250 rubles for each day of delay until new estimates and information according to form No 6 are presented. Mutual sanctions on the client and contractor permit reinforcement of the economic responsibility of the construction participants. The greater responsibility of the client is confirmed by a greater sum of forfeit in the case of levying an increased rate for credit of 4 percent annually.

To intensify the responsibility of construction participants for putting facilities into operation, it is necessary to apply banking influence on them equally. The simplest and at the same time most acceptable would be to recover a percentage from the client for use of a loan, related to facilities (jobs) not turned over within the deadline, if the planned deadlines of turning facilities over for operation are disrupted through the fault of the client. This would considerably increase his self-interest in the final results of construction.

It is felt that the procedure of crediting of facilities, financing of which has been temporarily stopped at the client's initiative, must be partially changed. The obligation for the loan, related to this group of facilities, should not be levied on the indicated organizations in the case of their

exceeding the established deadlines for accounting with contract organizations for jobs completed, but an increased percentage for the use of credit should be forfeited by the client. Introduction of the given proposal in economic practice will permit, on the one hand, elimination of unsubstantiated diversion of contractor funds for payment of increased percentages and, on the other hand, will create additional incentives in the client to provide timely settlements when a facility is temporarily closed.

The most important phase of circulation of internal and borrowed funds of a construction organization is that of realization of a commercial construction product. Settlements for completed products and those prepared for startup and service facilities are a progressive step in development of calculations and construction. However, cases of stated commissions signing reports for facilities that are deficient, as before, occur frequently. A possible and sufficiently effective measure of influencing the credit levers on the given negative aspect may be a procedure in which crediting of the volumes of work on facilities with completed construction is continued in the case of the client having signed the report of the working or state acceptance commissions, but if the facility has not been paid for within established deadlines, the client forfeits an increased percentage for exceeding the time limit of a loan.

As calculations show, even such slight changes in the crediting procedure will permit a significant reduction of payments for increased bank rates for reasons not dependent on the contractor. Thus, the given payments could be reduced by 75-80 percent for 1983 for the Komityazhstroy Association. This would in turn have a positive effect on the status of internal circulating funds, the stability of the financing situation and accordingly, on an increase of the operating efficiency of the contract construction organizations of the association. The role of the client in increasing the effectiveness of capital investments would be at the same time increased significantly.

There is a real need to conduct an economic experiment, during which the feasibility of numerous proposals to improve the existing crediting and accounting system in capital construction could be evaluated and realized.

6521
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STROYBANK GIVES PREFERENCE TO COOP HOUSING PROJECTS

Moscow FINANSY SSSR in Russian No 11, Nov 84 pp 45-47

[Article by A. A. Trifonova, chief of department of USSR Stroybank]

[Text] Improving the welfare of the Soviet people is the main sociopolitical goal of our state. According to the social program determined by the 26th CPSU Congress and according to the decisions of subsequent Plenums of the CPSU Central Committee, housing and cultural-recreational construction is being implemented on broad scales in our country, education, health and culture are being developed successfully and the real income of the population is increasing. A great deal of attention is being devoted to providing the Soviet people with well-built apartment buildings and aparments. Every family will have a separate apartment in the near future. Not only construction of housing at the expense of government funds but also construction of well-built dwellings at the expense of the funds of workers joined into housing construction cooperatives and government credit is contributing to solution of this problem.

Approximatley 38,000 dwellings of ZhSK [housing cooperative] with a total area of 108.7 million m^2 was introduced through credits of USSR Stroybank during 1962-1983. During the first 3 years of the 11th Five-Year Plan alone, 329,000 families received comfortable apartments in cooperative apartment buildings with an area of 17.6 million m^2.

Further expansion of the volumes of cooperative housing and assistance to workers in this construction at the expense of incentives funds of associations and enterprises are being provided. In a speech at a meeting with electors on 2 March 1984, Comrade K. U. Chernenko said: "We all understand of course that the housing problem is far from being solved and we will seek ways for further improvement of housing conditions, and not only from state funds. We also probably need to proceed more daringly toward expansion of cooperatives and individual construction."

The Soviet government offers great advantages to housing cooperatives. Construction of aparment buildings through housing cooperatives is carried out by the contract method, for which material and labor resources are provided annually in the plan for economic and social development of the country. The cost of constructing these apartment buildings is determined the same as the cost of apartment buildings constructed from funds of state capital investments, i.e., at wholesale prices for construction materials, structures and other products.

Members of housing cooperatives have received the right to make use of long-term low-cost government credit (at the rate of 0.5 percent annual rate). World War II veterans and their wives (or husbands) enjoy the right of obtaining no-interest credit. More favorable conditions of offering credit have been in effect since August 1982 and the scope of credit comprises up to 70 percent of the estimated cost of housing construction. The scope of credit has been increased to 80 percent in the Kazakh SSR, in Siberia, the Far East, arctic regions and locales adjacent to arctic regions and also to mining settlements. The cost of outbuildings (for private-plot farming) is also taken into account in determination of the total.

A unified period for repayment of credit--up to 25 years--has been established for all cooperatives. Cooperative housing can be constructed after deposit of not less than 30 percent (earlier not less than 40 percent) of their own funds by cooperatives and not less than 20 percent (earlier not less than 30 percent) of the estimated cost of constructing a building and after credit has been advanced to the cooperative in the Kazakh SSR, Siberia, the Far East, in arctic regions and locales adjacent to arctic regions and also in mining settlements.

To reinforce control over construction of cooperative housing, the functions of client on design and construction of it have been entrusted to the enterprises, institutions, organizations, kolkhozes and other cooperative and social organizations in which cooperative housing has been organized (these functions were transferred only to UKS [Administration of Capital Construction] and to OKS [Department of Capital Construction] of the ispolkoms of the Council of Working Peoples Deputies prior to August 1982). The design-estimate documentation for construction of cooperative housing (at the expense of cooperative funds) is developed by state planning organizations. All expenditures, related to preparation of the construction territory and of supply lines unrelated to apartment construction (city supply lines), are borne by the state.

Commercial enterprises and institutions, catering enterprises and institutions and so on may be located in spaces in cooperative buildings with their agreement. These spaces are constructed at the expense of capital investments provided for the given purposes within established procedure, rather than at the expense of the cooperative housing funds.

Practice shows that circumstances are more favorable with cooperative housing which is constructed in regions of mass housing construction, having roads and major engineering supply lines provided by cultural-service institutions and located near enterprises. The collectives of the latter assist in this construction, while the workers and employees who become members of the cooperatives take an active part in the labor. All this helps to reduce the deadlines and to improve the quality of construction. Examples may be the Saratov housing cooperatives Zhuravl' and Severyanka. Cooperative housing is being constructed in Arkhangelsk, Volgograd, Kursk and Saratov Oblasts and in Krasnodar and Khabarov Krays.

One million m^2 more cooperative buildings were constructed in 1983 than in 1982. The plan on introduction of cooperative housing was fulfilled by the ispolkoms of local Councils of Working Peoples Deputies of the Lithuanian SSR (100.2 percent). The plan of the Belorussian, Latvian, Armenian and Estonian SSR was fulfilled by 92-97 percent. However, the situation could have been better if all enterprises, institutions, organizations and Councils of Working Peoples Deputies had coped with the tasks on construction of cooperative housing. This matter is poorly organized in the Kazakh SSR, the Georgian SSR and Kirgiz SSR, where the 1984 plan had been fulfilled by only 29, 37 and 38 percent, respectively, by 1 July.

Unsatisfactory fulfillment of tasks is the result of insufficient attention of local economic and Soviet organizations to the given construction and in some cases a lack of desire of contract organizations to construct cooperative housing. This is also confirmed by the fact that the plans for construction of state housing are fulfilled considerably better. For example, the plan for introduction of apartment buildings in the Azerbaijan SSR was fulfilled by 102 percent according to the plan of state capital investments in 1983, or 43 percent greater than the plan for introduction of apartment buildings through cooperative housing funds. The plans for cooperative housing construction were fulfilled by 34 and 63 percent lower in the Kirgiz and Turkmen SSR than the plans for construction of state housing.

This situation is possibly explained by the fact that contract organizations are not interested in construction of cooperative housing, since the builders do not receive 10 percent of the area introduced in the apartment buildings, as is provided in construction of state housing. The fact that ministries and departments of the USSR and of the Councils of Ministers of the union republics do not devote the proper attention to organization of this construction also has a negative effect on the status of cooperative housing construction. After plans have been submitted to subordinate enterprises and ispolkoms of Councils of Working Peoples Deputies, they do not take subsequent action to eliminate the causes that delay the given construction.

Mintsvetmet SSSR [USSR Ministry of Nonferrous Metallurgy], Mintyazhmash [Ministry of Heavy Machine Building], Minlegpishchemash [Ministry of Machine Building for the Light and Food Industry], the Ministry of Civil Aviation, Minpromstroy SSR [USSR Ministry of Industrial Construction], Minmyasomolprom SSSR [USSR Ministry of the Meat and Dairy Industry] and Mintransstroy [Ministry of Transport Construction], who fulfilled the plan of capital investments by only 3-33 percent, were unsuccessful in coping with the 1983 task. Due to failure to provide design-estimate documentation, the absence of formulated housing construction, failure to allocate construction sections and other factors, construction of 235 apartment buildings was not begun last year.

The enterprises, institutions and organizations on coordination with trade-union organizations has been authorized to direct economic incentives funds to render free material assistance and to partially repay the credit issued for cooperative housing to workers who have worked at these enterprises, institutions and organizations for not less than 5 years and to newly married workers who have worked not less than 2 years. They have been able since August 1982

to render free material assistance from the material incentives fund and the sociocultural and housing construction fund of up to 15 percent and to newly marrieds of up to 20 percent of the initial payment of their own funds, subject to payment prior to the beginning of cooperative housing construction. The extent of assistance is up to 30 percent in regions of Siberia, the Far East, the Arctic and rural locales of the Nonchernozem zone of the RSFSR, while the rate for newly marrieds is up to 40 percent of the initial payment of their own funds.

It has been authorized to repay from the above economic incentives funds up to 15 percent of the remaining obligation of workers who have worked at an enterprise, institution and organization for more than 5 years after implementation of cooperative housing and up to 30 percent for those who have worked more than 10 years. It has been recommended that a similar procedure of material assistance to cooperative housing members be established by kolkhozes and other cooperative and public organizations. Thus, the cost of cooperative apartments for workers who have received assistance from economic incentives funds is almost one-fourth as much.

In 1983, 448 enterprises assisted their own workers, ITR [scientific and technical personnel] and salaried employees who participated in cooperative housing. The enterprises and organizations of Leningrad (specifically, the Elektrosila Plant of the Ministry of the Electrical Equipment Industry), Rostov (Sel'energoproyekt [not further identified] and Energoset'proyekt [All-Union Order of the October Revolution State Planning-Design and Scientific Research Institute of Power Systems and Electrical Networks]) and a number of others have made wide use of this right. However, there are also those who are not utilizing the right offered to them (enterprises of the Uzbek, Tadjik, Kazakh and Turkmen SSR).

It has now been authorized to construct single- and two-apartment garden-type buildings and also multiapartment block buildings with plots for private gardening in cities and city-type settlements for cooperative housing, along with multiapartment buildings (with the exception of populated points in which no land has been allocated for individual housing according to legislation). But this form of cooperative housing has not yet achieved the proper development. Only seven of these cooperative housing projects was developed in the Lithuanian SSR last year.

Ministries, departments and ispolkoms of local Soviets of Working Peoples Deputies are not conducting the necessary organizing work and are weakly utilizing the right offered by the USSR Council of Ministers to transfer to cooperative housing apartment buildings that have been constructed or on which construction has begun at the expense of state capital investments, and they are also not developing the corresponding design-estimate documentation. Only 10 oblasts of the RSFSR and of the Ukrainian, Uzbek, Kazakh, Lithuanian and Turkmen SSR made use of this right last year, and then on a limited scale.

It is planned to increase the task for introduction of total (useful) area in cooperative buildings by 1.5 million m^2 in 1984 compared to the level provided by the five-year plan. Twice as many cooperative buildings should be

constructed during the next five-year plan than during the 11th Five-Year Plan. This prospect requires improvement of management of the given construction. To maintain the existing practice of cooperative construction, it would be feasible to adopt a number of measures, directed toward improvement of the situation in this construction. Specifically, the violations committed by clients in planning cooperative housing, which were mentioned above, should be eliminated.

We feel that there are two paths. The degree of responsibility of clients, who include apartment buildings in the cooperative housing plan in the absence of formulated cooperative housing, confirmed by design-estimate documentation, and prepared sections must be determined. The obligatory tasks of contract ministries in construction of cooperative housing should also be included in the plan for economic and social development of the USSR. On the other hand, the interests of contract organizations should be reinforced, having established a procedure in which 10 percent of the area is allocated to the contractor at the expense of ispolkom funds upon introduction of cooperative housing buildings, as is done in construction of state housing.

6521
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INTEGRATED APPROACH TO INVESTMENT ADVOCATED

Moscow EKONOMIKA STROITEL'STVA in Russian No 7, Jul 84 pp 37-42

[Article by A. F. Klyuyev, candidate of economic sciences; R. M. Merkin, doctor of economic sciences and professor; and Yu. P. Panibratov, candidate of economic sciences: "Improving the System of Cost-Accounting [khozraschet] Relations and Conducting a Broad-Scale Experiment in the Sphere of Capital Construction"]

[Text] An analysis of the present state of affairs in capital construction confirms quite obviously the need to seek out measures which would make it possible to guarantee that construction is switched to the strategy of intensive development in order to substantially improve the efficiency of the process of reproduction in the country.

Experience in the conduct of economic activity under the new conditions over the period 1981-1983 indicates that there are major shortcomings in the process of carrying out capital investment programs:

i. even now the uniform system of cost-accounting relations has not equally covered all participants in capital construction. To be specific, clients, project planning organizations and agencies of USSR Stroybank are ruble-accountable to a considerably smaller degree than construction organizations for the quality and end results of their work, which is having an adverse effect on achievement of the final results from the standpoint of the national economy and is placing the participants in capital construction in unequal conditions;

ii. the shift to the new conditions for the conduct of economic activity has not had a decisive impact toward reducing the "demand" for capital investments and has not sufficiently stimulated their treatment as a scarce resource to be used economically;

iii. in spite of the favorable shifts which have been outlined in recent years, the reliability of obtaining the planned end results of the construction effort still falls far short of meeting the economy's requirements at present. A sizable proportion of projects is activated later than planned. The probability of activating projects for production purposes on schedules does not exceed 55 percent in a number of organizations, and the probability

of obtaining the planned proportion of profit is 30 percent. The length of the investment cycle, and that includes the construction cycle, is being shortened slowly at present, and this process is lagging behind the target envisaged in the Comprehensive Program of Scientific-Technical Progress. So far targets for reducing the average construction time have not been planned for construction organizations. Nor has regular recordkeeping on construction time been set up;

iv. construction remains the only sector of the economy in which the same payment is made for a product of differing quality;

v. construction organizations are not oriented toward comprehensive improvement of production efficiency so as to take into account the economic consequences of changing the construction time and the quality of construction. Targets for increasing production efficiency are not planned for construction organizations, and the multipurpose incentive systems in effect are operating in different directions at once;

vi. construction is still continuing to develop primarily by virtue of extensive factors (their share was more than 86 percent in the 10th Five-Year Plan), in which the growth rates of the capital-labor ratio exceed the growth rates of labor productivity; as a result the "price" of replacing live labor with fixed capital has more than tripled in the construction sector over the last 10 years.

The difficulties and shortcomings noted above (and others) can be overcome only if the conditions for carrying on the process of capital construction are normalized and if the economic mechanism undergoes further improvement.

It should be noted that the following factors have had an adverse impact on the economic results of the performance of construction organizations over the last 6-7 years:

i. prices of construction equipment have increased faster than its productivity, which has substantially distorted the indicators of the capital-labor ratio and the output-capital ratio, reducing their real level by 15-17 percent;

ii. construction organizations have not been fully compensated for real outlays related to the change of wholesale prices and rate schedules, which has artificially reduced profitability in construction and distorted calculations of production efficiency and the efficiency of capital investments;

iii. the estimated cost of construction has not been stable and delivery dates for the principal processing equipment have not been in line with the dates assigned for activation of production facilities and construction projects, which in many cases has increased the construction time of projects and unjustifiably deprived construction organizations of many benefits envisaged by the present economic mechanism.

But we would like to emphasize that the effectiveness of the measures being conducted to improve the economic mechanism and the broad-scale economic

experiments intended in capital construction can be objectively revealed only under stable comparable conditions. That is why the stability of prices and of conditions external to the sector for carrying out capital investment programs is a most important prerequisite for all the proposals set forth below.

It can be stated in this connection that many requirements advanced by the decree of the CPSU Central Committee and USSR Council of Ministers concerning improvement of the economic mechanism (12 July 1979) are not being met. This pertains to the material and technical supply of construction through the components of USSR Gossnab in terms of physical volume, the stability of planning targets, the delivery of project documentation to construction and installation organizations by 1 July of the year preceding the planning year, and a number of other important items.

From our standpoint the entire process of improving the economic mechanism in capital construction must be aimed at ensuring achievement of the final economic results assigned in advance under fixed conditions, which will make it possible to discover on a strictly scientific basis the actual direction and effectiveness of the provisions adopted (or being verified by experiment). "Final economic results" does not mean activation of projects "at any cost," but achieving the given physical results while attaining the planned level of production efficiency.

In view of the need for comprehensive and thorough verification of the direction and character of the impact of the various proposals for improvement of the economic mechanism as a whole and for its individual elements on production efficiency, it is advisable to verify some of them by conducting broad-scale economic experiments in construction. We would like to emphasize that by contrast with the well-known Belorussian experiment, there is now very good reason to conduct several broad-scale experiments in various organizations which would differ considerably in the conditions under which they conduct their activity.

This approach would make it possible to discover at one and the same time (which would save a considerable amount of time) the advantages and shortcomings and level of effectiveness of the various provisions and incentives so as to take into account everything that is constructive in extending the experiment on a broader scale.

In our opinion the need for organizational revamping of the management system is an important feature of conducting broad-scale economic experiments in construction (by contrast with industry). This is necessary to the discovery and effective utilization of that internal potential which objectively exists in the sphere of capital construction and the construction process proper, but which cannot be fully manifested with the present organizational forms of management in place.

We are referring above all to fuller utilization of the benefits of integrality related to performance of the following measures:

i. optimalization of management of construction in regions. The present situation in which a large number of construction and installation organizations under differing departmental jurisdiction operate simultaneously within the republic and oblast results in the creation of tiny small-capacity enterprises and organizations, results in a lack of coordination between production capabilities, increases the volume of cross-hauling, and lowers the efficiency of capital investments in terms of the growth of capacity. Construction and installation organizations of nonconstruction ministries which were created at one time to perform major repairs on buildings and installations and for reconstruction and retooling of existing enterprises and to some extent for building production facilities, are now performing other types of construction as well, including housing and civil engineering projects. Consequently, in many regions the share of work done by construction organizations of general construction ministries is dropping not only in industrial construction, but also in public works and housing construction. All of this gives rise to the need, first, to put order in the network of construction and installation organizations in the region by creating a head construction organization and by assigning it broader powers; second, to develop in the region a production capability for construction on the basis of cooperation and integration among economic entities; third, to create special authorities to manage the material and technical capability of construction, say, within ispolkoms, using the rights granted to them to coordinate the activity of organizations functioning within their jurisdiction;

ii. increase the size of construction organizations to the optimum level and set up project planning and construction associations. This must include eliminating small construction organizations whose work program is less than 10 million rubles for trusts and less than 1.5 million rubles for SU(PMK) [construction administrations (mobile mechanized columns)]. Economic analysis has shown that they cannot operate profitably regardless of the conditions. Labor productivity in such organizations is 30 percent lower than the average for the sector when the capital-labor ratio is almost the same. It is assumed that this proposal would be carried out on a somewhat different economic basis than has now been adopted. When construction organizations are consolidated at the present time, the organizations themselves and their superior management authorities have practically no economic motivation for this. Accordingly, in our opinion it would be advisable to distribute the annual saving of funds to maintain management personnel as follows: earmark 50 percent for the state budget and turn 50 percent over to the consolidated construction organizations for the entire period the experiment is conducted to be credited to their economic incentive funds. Any subsequent increase in expenditures to maintain administrative and management personnel the construction organization must also cover with resources from the economic incentive funds;

iii. reduce the number of tiers of management. In order to increase the motivation of the relevant authorities to carry out this measure it would be advisable in our opinion to earmark 50 percent of the annual saving as a revenue of the state budget and 50 percent to compensate the additional efforts of the management staff at the higher level and for material incentives of the management staff of the higher organization or management body. This saving must be paid annually throughout the entire period the experiment is conducted.

Increasing the size of construction organizations and creating project planning and construction associations requires a substantial revamping of usual conceptions of the functions of organizations figuring as general contractors, their organizational structure, and also the economic methods used to exert pressure on partners in the process.

In the course of the economic experiment it is advisable to carry on comprehensive planning of the investment cycle: planning for the group of projects of differing kinds being built by the large-scale construction organization, dates for starting and completing project planning, for approval of project plans, for starting construction, for activation of the enterprise and for attaining its rated capacity, in connection with drafting the title list of the construction project for the entire length of the investment cycle, indicating the specific organizations responsible for performing the project planning operations, expert evaluation and approval of the project plan, for construction and for bringing every enterprise (independent complex) up to rated capacity. The projects included on that title list automatically are included in the plans of all the relevant organizations, which would guarantee stability of the decisions taken. This procedure would make it possible to guarantee timely engineering and financial preparation of the investment cycle in an integrated way as well as effective monitoring of progress in carrying out the entire program.

Contracts must stipulate substantial cost-accounting penalties for late delivery of project documentation (section concerning production process design) and for late delivery of the necessary equipment, building materials, components and fabrications. The size of these penalties should be determined in such a way that they guarantee, first, full reimbursement of the loss incurred, i.e., all types of direct losses related to nondelivery or incomplete delivery; second, reimbursement of the lost gain, i.e., those incentives which the construction organization would have received if construction and installation work had been completed on time; and third, a fine.

The planning of the production program should be linked to the capacities of construction organizations determined on the basis of the temporary instruction on calculation of the production capacity of construction organizations for the initial period (the base period in conducting the experiment). As the production program increases later on, additional capital investments must be allocated to develop the capacities of construction organizations at standard rates specifically worked out for this purpose.

In case the growth of the production program is achieved by activating internal potential, i.e., with a saving on capital investments necessary for development of capacity as compared to those determined from the standard, it would be advisable for 50 percent of the amount saved to be committed to the budget, and 50 percent left to the disposition of the construction organization. In our view this approach would make it possible to give construction organizations an economic incentive to develop primarily on the basis of intensive factors and to force them to introduce more extensively those measures which do not require sizable capital investments (in particular, to intensively saturate the construction process with power tools and the standard complement of equipment for the job to be done).

Planning the economic efficiency of production in construction organizations must become an inseparable part of the broad-scale economic experiment. The methodology for such an experiment has been worked out by NIIOUS [Scientific Research Institute for the Organization of Management in Construction] of MISI [Moscow Order of Labor Red Banner Construction Engineering Institute imeni V. V. Kuybyshev] and LenTNILOES [further expansion unknown] of the Leningrad Construction Engineering Institute and verified in the trusts Bumpromstroy [Paper Industry Construction], which is part of the association Komityazhstroy [Construction of Heavy Industry Enterprises in Komi ASSR] of USSR Mintyazhstroy [Ministry of Construction of Heavy Industry Enterprises], and Bashneftezavodstroy [Petroleum Refinery Construction in Bashkir ASSR] of USSR Minpromstroy [Ministry of Industrial Construction], pursuant to an authorization issued by USSR Gosplan and USSR Gosstroy.* It is being proposed in this connection that changes be made in the system of planning indicators and that all types of bonuses be abolished (except bonuses for efficiency proposals and inventions) and that the transition be made to a single type of bonus qualification--for achieving the planned final economic results.

One of the important conditions for the proposed experiment is changing the procedure for stimulating the rise of quality of construction and reduction of construction time. Objective analysis allows us to conclude that at the present time builders do not suffer economically to any serious extent because of the low quality of projects they put into service. The customer pays them the estimated cost of the project delivered if the evaluation gives it three points for quality, if the requirements of SNIP [Construction Norms and Rules] have been precisely followed, which corresponds to a grade of four points, and also when the evaluation gives it five points, which means that the builders must achieve a level of quality higher than that envisaged by the standards. It is not surprising that the share of projects delivered with an evaluation of "excellent" is very small (between 2 and 5 percent of all the projects activated).

Yet the higher the quality of projects delivered for operation, the shorter the time required to reach capacity and achieve the projected economic indicators of enterprises put into operation and attain their future operating costs (including expenditures for repairs of all types). Research which has been conducted** has made it possible to determine the additional benefit resulting from improvement of the quality evaluation by one point: it is 30,000 rubles per year for every 1 million rubles of capital activated.

It would accordingly be logical in our view if when the project delivered is evaluated "satisfactory" the construction organization were paid 97 percent of its estimated cost, 100 percent for a grade of "good," and 103 percent for a grade of "excellent."

It has become indispensable to stimulate the planned reduction of construction time. Regardless of the purpose of the project, in our opinion it is advisable to pay the construction organization 100 percent of its estimated cost when

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* EKONOMIKA STROITEL'STVA, No 8, 1980, p 41; No 6, 1981, p 41.

** By R. Galeyev under the supervision of Professor Yu. B. Monfred.

the planned construction time is met and corresponds to the standards. When projects are built within the planned time, whose length is t (years) less than the standard allowance, the construction organization would be paid $100(1 + 0.08)^t$ percent of the estimated cost of the projects activated; when the construction time is t (years) longer than the standard allowance, it would be paid $100(1 - 0.08)^t$ percent of the estimated cost of projects activated.

Funds envisaged in construction estimates could be the source of the additional payments in these cases. But in order to increase the cost-accounting motivation of customers such payments should in our opinion be made from the profit of their principal activity or the profit (reserve) of ministries.

When the planned time or actual construction time does not meet the standard allowances through the fault of the customer, the customer must pay the bank that difference. This would stimulate concentration of capital investments even in the stage of the customer's drafting of his plan, since failure to meet the standard construction time would bring inevitable economic penalties upon him. In connection with reconstruction or expansion of existing enterprises it would seem wise if the higher percentages were paid by those enterprises out of their profit, as is the case with other fines, and when new construction is involved (before production has begun) by the superior management authorities. This procedure would compel the customers to think seriously about whether to include the new project in the plan if one begun previously has not been completed.

It has already been repeatedly noted in the press that one of the major shortcomings in the present economic mechanism is the low motivation of many partners of the construction organizations to achieve high final results from the standpoint of the national economy.

In addition to partners outside the construction field (those who are the customers of capital investment projects, equipment suppliers, etc.), this applies fully to highway transport organizations and specialized subcontractors and also to suppliers of parts and fabrications used in construction, whereby the siphoning off of the surplus product created in general construction organizations to these organizations and enterprises is continuing. It is no accident that the profitability of general construction organizations is between one-half and two-fifths that of the enterprises and organizations serving them.

One of the possible ways of solving the problem might be to plan and evaluate the performance of economic entities serving construction organizations with respect to the indicator "level of service."*

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* Use of this indicator in an experiment to evaluate the performance of trucking enterprises was recounted in an article by R. M. Merkin entitled "Improvement of Economic Relations as a Factor in Resource Economy and Capital Construction," published in EKONOMIKA STROITEL'STVA, No 5, 1984. Similar proposals have been worked out in NIIOUS of MISI for industrial enterprises and specialized organizations.

Use of this indicator links the operating results of the service entities directly to the punctuality of performance of obligations stipulated in the contract and to the quality of the service. Broad-scale experimental verification of the mechanism whereby the indicator "level of service" influences the end result of the construction process will make it possible to determine its effectiveness and the optimum limits of its use.

Within the framework of the broad-scale economic experiment it is also advisable to amend the procedure for planning production operations which serve construction. At the present time plans for production of products and components, especially those made of reinforced concrete, do not at times correspond to the real needs of construction organizations.

In a number of the country's regions and for many construction organizations in which the volume of construction is dropping off, but the conditions do not exist for economical transfer of construction components to other regions, it would be advisable to also decrease correspondingly the volume of production of reinforced concrete. But here a conflict comes about between the interests of construction organizations and those of enterprises for the production of reinforced-concrete products, which, since they plan "from the base level," are not motivated to reduce the volume of production.

As a rule this brings about a reduction of the total amount of profit, economic incentive funds and a drop in labor productivity for the latter.

That is why the managers of enterprises use any means in the attempt to justify the need for retaining the volume of production that has been achieved regardless of the real needs of construction organizations; in so doing very often they compel them to order products which the builders do not need and which cannot be used quickly.

It is obvious that producing an excessive amount of prefabricated construction components and fabrications represents an additional expenditure for the national economy, and in a number of cases it is even an obstacle to development of more economical cast-in-place structures.

In order to guarantee more complete and flexible recordkeeping of the objective needs of construction organizations for building fabrications, it would be advisable within the framework of the broad-scale economic experiment to implement the following principles:

i. instead of setting them forth in the state plan, allow construction ministries, on the basis of the real needs of construction organizations, to draw up production plans for the enterprises in the production segment of the construction sector, mindful at the same time of unconditional and complete assurance of deliveries of the relevant products to external consumers. Returnable (vozvratnyye) plans ought to be the basis for drawing up these production plans;

ii. establish a procedure in which late orders of construction organizations or those orders which do not correspond to the output envisaged by quarterly

plans be filled by industrial enterprises with markups added to the basic prices (i.e., taking into account penalties): when the order is late (is not submitted within the periods stipulated in advance), its cost would be raised 2-4 percent; when the order exceeds the volume of production stipulated by the quarterly plan or when an order previously agreed to has been refused, a fine would be collected in the amount of 5 percent of its value; when industrial enterprises fail to fulfill the plan for aggregate deliveries of construction components and fabrications, they would be paid only 80-85 percent of the value of the delivery in question.

Decree No 695 of the CPSU Central Committee and USSR Council of Ministers, dated 12 July 1979, envisages in Point 37 that outlays on unfinished construction work of contract organizations are to be covered with bank credit until exploration of the planned periods for delivery of the projects for operation. The instructional guidelines of USSR Stroybank elaborating this decree have established the procedure for extending bank credit to contractors in order to cover all outlays for the performance of construction and installation work.

However, as indicated by the experience gained in the period 1981-1983 in the system of credit financing and settlement regulated by authorities of USSR Stroybank between contractors and customers, there are a number of unresolved issues. Since the administrative and economic pressure of the construction contractor on the customer is very limited within the framework of the economic mechanism now in place, bank penalties become considerably more important in the system of relationships "general contractor--customer."

An analysis of the performance of a number of construction organizations under the new conditions for credit financing allows us to conclude that in many cases construction organizations are paying interest on the bank credit (especially the higher penalty rates) through the fault of customers who are not meeting their contractual obligations, but are not at present subject to effective financial liability.

One of the main principles of bank credit financing in the USSR is the principle of direct credit and the absence of commercial credit, i.e., there are no middlemen of any kind between the bank and the customer. In the present system for the credit financing of construction this principle is violated because the timeliness with which the bank furnishes the funds to the contractor to fulfill the assigned plan depends on the formation of capital by the customer.

It would seem advisable in carrying out the broad-scale experiment to make certain changes in the procedure for the credit financing of construction organizations participating in it. Above all the credit financing of the contractor should be continuous within the limits of the planned volume of construction and installation work regardless of the customer's fulfillment of the plan for payment of its own capital into the bank out of the total accumulation of funds for the relevant establishment of Stroybank which is doing the credit financing, and out of the funds of the superior institution of Stroybank in the necessary cases. In such a situation it would seem advisable to invoke against the customer who is delaying the posting of his own funds to

finance the planned capital investments penalties in the amount of 4 percent of the amount of credit extended to the contractor.

The possibility for implementing this proposal in practice by means of responsive shifting of resources of the republic offices of USSR Stroybank is confirmed by their practical experience.

In order to ensure that construction receives project plans and estimates completely and punctually, it is proposed that the outlays of the contractor be credit-financed on projects carried over into the plan should that documentation be lacking (in connection with review and approval), charging the contractor 4 percent for the credit. The customer would at the same time be fined 250 rubles for every day of delinquency until the new estimates and papers on Form F-6 are submitted.

The application of two-way penalties (toward both the customer and the contractor) in a case when project plans and estimates duly agreed to and approved are lacking makes it possible to avoid the vicious circle of reduced economic accountability of participants in construction. Under the proposed system of fines, the accountability of the customers would take the form of a higher total amount of forfeiture.

At the present time between 30 and 40 percent of the production capacities not activated on time are late because of reasons that depend upon the customer. Such a sizable dependence of activation (and consequently also of the contractor's financial condition) on causes external to the construction organization dictates the urgent need to sharply increase the accountability of the customer for fulfillment of contractual obligations. In our view the following are advisable to that end:

i. when the planned periods of time for delivery of projects for operation are exceeded through the customer's fault, the interest on use of bank credit through Account 317 would be collected from the customer;

ii. unfinished construction work on planned projects carried over, when their financing has been temporarily suspended through the fault or initiative of the customer (except in cases specifically stipulated) would be financed with credit until the customer pays the outlays to the construction organization. Should the deadline for payment (30 days) be exceeded, the higher rate of interest on the credit (4 percent) would be collected from the customer.

Adoption of this proposal in economic practice would make it possible to guarantee the normal functioning of the contractor's organizations at these projects and preclude unjustified diversion of his resources to pay the higher rate of interest. In addition, the proposed redistribution of the liability to fines would help in furthering the required work with claims in the system of settlement (customer--contractor) and would reduce the profitability that state acceptance commissions would sign documents for projects that include defects.

In order to improve maneuvering with the resources allocated, it is proposed that the costs of the contractor over and above the estimate be financed with credit for the volume of construction and installation work actually performed within the limits of the summary calculation of the estimated cost of construction until new estimates are approved. Credit financing within the limits of the summary calculation of the estimated cost of construction will make it possible to avoid additional outlays of the contractor related to errors of project planners.

The article has, of course, not taken up by any means a full list of the urgent problems of construction economics. It is evident that readers do not share all the considerations expressed in it. But, we are profoundly convinced, only a broad discussion of the state of affairs that has taken shape in capital construction, a collective exploration and experimental verification of ways of promoting its rapid and sharp improvement will help to solve the problems which have come to a head.

7045
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MATERIALS SUPPLY NETWORK IN DAGESTAN CRITICIZED

Moscow EKONOMICHESKAYA GAZETA in Russian No 42, Nov 84 p 22

[Article by M. Yakh'yayev, Chairman of the Dagestan ASSR Committee of People's Control: "Discovering Is not Enough"]

[Text] The agencies of People's Control in Dagestan are continually strengthening efforts to supress violations of state discipline and to protect state property.

Participants in an inspection at the Izberbash Electric and Thermal Equipment Plant, the Makhachkala Plant imeni Magomed Gadzhiyev, the "Dagestansnabsbyt" Association, the "Dagelektromash" plants and a number of others, carefully analyzed the reasons for inadequate operational efficiency and made about 2,000 suggestions to eliminate losses of materials and other valuables.

A people's control group at the "Dagelektromash" Plant included a study of the geography of deliveries of the same type of products in their inspection plan and established that welding units from their plant are being dispatched to the Urals. At the same time similar units produced in the city of Ural'sk are arriving at the address of the republic's Sel'khoztekhniki. Cross deliveries were eliminated as a result of the measures taken.

To this day the Buynaksk Tire Repair Plant receives technological rubber from Chimkent. Yet such a raw material is produced in a plant in Nevinnomyssk which is located just 450 kilometers from Buynaksk. This means that a judicious solution is also needed here.

Recently a check was made of how well the CPSU Central Committee and USSR Council of Ministers' decree "Concerning an Increase in Efforts to Economize and Efficiently Use Raw Materials, Fuel, Power, and Other Material Resources" is being implemented at enterprises and construction organizations in the Dagestan Construction Administration.

People's controllers established that they were only paying lip service toward economizing cement, metal and lumber without the required responsibility. Specific economy measures, based on a five-year schedule as required, had not been worked out. The administration often gave complete control of the standards for the consumption of materials to a subdivision under its jurisdiction. And these subdivisions selected "convenient" standards which, as a rule, were higher than those approved by USSR Gosstroy.

Those produced by the administration for reinforced concrete proved to be much higher than the standard. And other types of production could not withstand a comparison to the models approved by the USSR Ministry of Industrial Construction as being average standards.

Violations of production and technological discipline were also discovered. Almost 2,000 rubles were spent during the year alone to correct the administration's waste.

By a resolution of the Dagestan ASSR Committee of People's Control, S. Izrailov and N. Selimov, deputy chiefs at the administration, I. Isakov and P. Popov, chief and chief engineer of the Complete Production and Technology Provisions Administration, and several other people in responsible positions were severely punished. Monetary fines were assessed against the guilty parties. Those materials showing add-on charges and intended as a deception were given to agencies in the procurator's office.

Based on recommendations by the Dagestan ASSR Committee of People's Control meetings of labor collectives were held at all enterprises at which the managers of construction administrations spoke explaining the reasons for the deficiencies that were discovered and the measures being taken to eliminate them.

Examining transportation matters and reducing operational expenses is an important component part of the work of the people's control agencies. Investigators found serious deficiencies and a considerable amount of add-ons to cargo volume and transport distances in the transportation affairs of a number of departments and enterprises. For example, during one period under investigation 40 percent of the trucks travelling along the Rostov-Baku highway had no cargo and 70 percent of the trucks had no trailers. A great number of motor vehicles belonging to the "Dagvino" and "Dagneft'" Associations, the Dagestan Construction Administration and several others travelled with no cargo. Add-ons to the volumes of work were discovered in these and other departments and in a number of kolkhozes and sovkhozes. Facts were uncovered showing a lack of efficiency and that gasoline and diesel fuel were squandered and overdrawn.

The results of the investigation were discussed by the agencies of people's control. More than 80 people in positions of responsibility were held accountable, several were given monetary fines amounting to more than 6,500 rubles, and several administrative workers were suspended from the positions they held.

Questions have been repeatedly posed in the press, and in EKONOMICHESKAYA GAZETA in particular, associated with working out measures that would eliminate the "forced" add-ons to the number of kilometers by the clients and which would pay drivers based on quantitative and qualitative indicators. Control over these operations must be strengthened while at the same time holding administrators strictly responsible for any violation or deficiency in protecting socialist property.

And, certainly, it is very important to precisely establish the reasons that give rise to negative phenomena and this can be confirmed by the practical work of the headquarters for controlling the republic's motor vehicle transport operations, which was formed in the "Dagavtotrans" Association, with the active participation of people's controllers. They do not just state the non-productive use of motor vehicle transportation, but also do much to elimnate the possibility of adding-on charges for work that was not done, financing violations, and accounting misrepresentations.

Twice a month the headquarters gives the results of its activities, and sometimes a meeting is called at the signal of an inspector's group or people's controllers. We punish those guilty of squandering the national property, levy fines, and in the most serious instances, give the materials to the procurator's office.

Preparations to operate under winter conditions imposes particular responsibility on the people's control committees, posts and groups. This matter is under constant attention. Recently, more than 1,000 people took part in the inspections and raids. The metropolitan people's control committee looked at the problem of preparing for winter three times.

At the moment that one inspection took place, inspectors established that the plant imeni M. Gadzhiyeva was only 30 percent prepared for winter operations. Now the enterprise is completely ready. This could also be said about the State Committee for Agricultural Technology. The "Dagrybprom" Association is completing work. Finish up and prepare for winter in the urban economy.

9495
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NEW KILNS, REFRACTORY BOOST CEMENT PRODUCTION

Moscow TRUD in Russian 20 Oct 84 p 2

[Article by B. Pipko, foreman of rotary furnace operators at the Novospasskiy Cement Plant, V. Kuznetsov, deputy chief of the shop and USSR State Prize laureate, and B. Gandich, fettling worker at the "Spasskcement" Association: "A Fireproofing Flaw"]

[Text] Spassk-Dal'niy, Primorskiy Kray--The Novospasskiy Cement Plant, the giant of the Far East construction industry, recently completed its eighth year since turning out its first product. The latest in domestic and foreign equipment and the high level of operator expertise made it possible for the enterprise to reach the designed capacity ahead of schedule--turning out 125 tons of clinker per year. Today that indicator has been surpassed by 10 tons and become the planned indicator. In addition, the crew of operators on rotary furnace No. 1 turned out a million tons of products last year. Units of this type have up to now not achieved such productivity in our country.

However, during the time that the plant was in existence it did not turn out products on 225 days and failed to provide consumers with almost one half million tons of the most important construction material. One of the main reasons for such a situation is the low quality of fireproofing brick which is required for fettling the kiln, due to which it was necessary to suspend operations 35 times for repairs which led to a loss of 100 tons of clinker.

Units of such a type that are also operating at several new enterprises in the sector require special fireproofing. Scientific research institutes in the sector have been engaged in solving this problem for many years. At the request of "Giprotsement" a small sample of fireproofing was manufactured for our furnaces in 1980 already at the Semiluki Fireproofing Plant in Voronezh. It must be said that they were very good, but after that the experiment was concluded.

We use products from the Novomoskovsk Fireproofing Plant in the USSR Ministry of Ferrous Metallurgy's system. As far as the blast furnace operators and steel workers are concerned these bricks are suitable but for us they are a mockery because the tolerances in laying the fettling for large diameter furnaces as established for us in Spassk are on the order of millimeters. Their failure to observe the requirements as well as making adjustments of the bricks on their own is categorically prohibited since this leads to the brick

coming out of alignment sooner. Yet we are forced to deal with this nonsense constantly since we must operate, we must meet the plan, we must produce cement! As a result of operating with such bricks the units operate only 90 days between repairs instead of 110 and thousands of tons of products are lost.

Losses...losses...incredible losses! How many construction sites we could have provided with additional cement and here we are counting up our losses. The fact of the matter is that the USSR Ministry of the Construction Materials Industry has no enterprise in its system that turns out the required type of fettling brick, while the USSR Ministry of Ferrous Metallurgy evidently establishes the products for its own plants. And they see no need there to increase quality control of the products shipped to clients in another sector and even less to begin manufacturing new sizes of fireproofing for them. What results is that a discussion must once again be held on the bureaucracy that makes your mouth sore, which is interfering by placing an impregnable screen over the fireproofing flaw which has not been publicized or criticized (and now we have even been deprived of this brick).

The Spassk cement workers are obliged to turn out 10,000 tons of clinker above the plan during the current year by means of increasing labor productivity. The limit is suspended, economically warranted, completely realistic. We are searching and finding optimum operating conditions for the units today in order to increase their capacity. The progress is obvious. There are larger shifts that produce 136 to 138 tons of products every hour. But fears for the fate of the socialist obligations for the entire four years and the upcoming year of the five-year plan never leave the collective.

We can and must work better. And this must also be understood by those on whom we depend to provide us with the necessary conditions for shock work. Our attempts, as they say, to patch small holes do not solve the whole problem. It is necessary for the administrators in two sectors--ours and ferrous metallurgy--to come to an agreement as to who and where the required material will be produced for us cement workers. Without solving this problem it will be difficult for us to successfully meet the plans. And even harder to draw up counter plans and operate based on them.

9495
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WAYS OF IMPROVING MOBILE CONSTRUCTION UNITS DISCUSSED

Moscow PROMYSHLENNOYE STROITEL'STVO in Russian No 8, Aug 84, p 10-12

[Article by S. P. Soskin and L. N. Komarover (NIIES [Scientific Research Institute for Experimental Design]) in USSR Gosstroy: "Increasing Mobility in Construction"]

[Text] The construction of important national economic projects in limited amounts of time requires that complicated problems of managing and organizing construction production be solved on time which consists of the necessity of building up and concentrating the capacities of construction organizations at starting structures on time. At the same time it is important to improve in every way possible the territorial and sector balance between the volume of capital investments and construction and installation work and the capacities of the production base and the availability of manpower. The problem of maintaining a balance attains special significance under conditions where remote and underdeveloped regions of the country are rapidly developed and where large territorial and production complexes are being built.

The specific nature of the social and economic conditions in remote regions makes it necessary to search for such approaches to developing them that would entail the minimum amount of expenses and would promote a rapid achievement of the final national and economic results.

The peculiarity of construction production and its increasing dependence on the environmental and economic conditions of the regions and the dispersion of the structures being erected results in an unevenness in the volumes of work within the confines of the overall construction timetable and creates an uneven pace of production at the same time. During the construction of industrial projects large peak workloads arise during certain periods of the work of construction organizations which exert substantial influence on the efficiency of their activities. Implementing special organizational measures is required to smooth over such workloads and to improve the steady pace of construction including such measures as sharply improving the efficiency of using personal production capacities, the planned formation of organizational capabilities based on an estimate of coping with the peak workload, and enlisting additional capacities from specialized construction organizations during the period that peak workloads arise.

The use of the first approach is not always possible while the second is not always economically justified. Thus, even a sharp improvement in the efficiency of the use of personal capacities in a short period of time, which in and of itself is a difficult enough problem, does not always make it possible to cope with the peak workload whose magnitude can substantially exceed the existing potential capacities. On the other hand the formation of stationary capacities for construction organizations based on the maximum possible peak workloads leads to the substantial underutilization of personal capacities during the course of the year, significantly lowers the technical and economic indicators for the activities of construction organizations, and lowers the economic effectiveness of capital investments to develop a production base for a construction organization. The third approach of relieving the peak workloads is associated with using the capacities of specialized organizations that are enlisted. In this instance a number of complications of an organizational and management nature also arise.

Stationary construction organizations that operate in economically developed regions of the country have assigned zones of service. The planned volumes of construction and installation work in these regions is usually even and often exceed the existing capacities of these organizations. Consequently, enlisting stationary territorial construction organizations to complete peak workloads entails taking material, technological and labor resources from these organizations' projects that they had been assigned to earlier and in the final analysis to a revision of the production program.

Enlisting stationary construction organizations from central regions to complete work in newly developed regions, in particular to alleviate peak workloads, is associated with difficulties in using workers and technology. The management structure in these organizations and the distinctive character of their economic activity does not correspond to the specific nature of the production units in the extreme conditions of non-developed regions. The necessary conditions for executing a quick maneuver with the required resources over substantial distances are lacking in stationary organizations.

Forming a stationary organization in regions where there is new economic development and ensuring that conditions exist for it to efficiently operate requires no less than two to three years which, in the majority of cases, is unacceptable due to the short length of time for building a project. In a number of cases the necessity arises of putting an individual structure into operation (for example, a compressor station on a pipeline run along with small auxiliary buildings and structures) that has a standard length of construction of two to three years. The absence of large amounts of long-range construction and installation work also makes it inefficient to form a stationary construction organization just for the period of erecting such dispersed structures.

In the above cases enlisting specialized mobile construction and installation organizations for producing the peak amounts of construction and installation work and for the virgin development of new regions has more long term importance. The formation of mobile construction and installation organizations is dependent on a number of objective factors which include:

a change in the territorial and sector structure of locating production forces through accelerating the use and development of remote and difficult to reach regions of the country that do not possess the necessary construction industry capacities;

a substantial growth in the volume of work at linear or extended structures that assume the availability of organizational forms in construction that are capable of providing improved mobility in production work technology;

the uneven nature of construction production and the existence of large peak workloads;

the availability of a relative surplus of labor resources in remote regions of the country with a simultaneous deficiency in others and an uneven distribution of qualified construction personnel among the territories of the country.

The resolutions of the 26th CPSU Party Congress indicate a need for further developing the network of mobile organizations and supply bases.[1] The inadequate mobility of construction organizations was noted at the November (1982) plenum of the CPSU Central Committee.[2]

In our view, a mobile construction and installation organization is understood to be a specialized organization that does production work and puts projects and production capacities into operation, first of all, in poorly developed regions and in regions that have an insufficiently developed construction base under conditions where they are continually reassigning their material, technical and labor resources to regions to produce construction and installation work and possessing the ability to quickly gear up production work at these places with their own mobile production base and housing, social and cultural zone.

At the present time construction organizations that have the status of being mobile are pictured as being the mobile construction and installation trusts that are a part of the All-Union Mobile Construction and Installation Associations in the Union of Special Industrial Construction in the USSR Ministry of Industrial Construction, the Union of Special Construction in the USSR Ministry of Construction and the Union of Special Heavy Construction in the USSR Ministry of Construction of Heavy Industry Enterprises or that are included in the territorial main administrations as is done in the USSR Ministry of Power and Electrification. The mobile trusts in the USSR Ministry of Construction of Petroleum and Gas Industry Enterprises are somewhat

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1 "Materialy XXVI S'yezda KPSS" [Materials on the 26th CPSU Congress], Moscow, Politizdat, 1981, p 175.

2 "Materialy Noyabr'skogo (1982 g.) Plenuma Tsk KPSS" [Materials on the November (1982) Plenum of the CPSU Central Committee], Moscow, Politizdat, 1982, p 16.

different in their makeup as they carry out the complete modular construction of land-based structures for operating pipelines (compressor stations, etc.)

The overwhelming majority of installation organizations in the USSR Ministry of Installation and Special Construction are essentially mobile since by the very nature of their activities and narrow specialization they continuously redeploy their production subdivisions from one project to another. However, the activities of the organizations in the USSR Ministry of Installation and Special Construction have their own special feature--they are included in the construction process primarily when the construction site has been developed and all the preparatory work and also a large portion of the basic work has already been completed. In this instance the general contractor is responsible for pproviding the necessary production, social and general conditions for carrying out installation work. Mobile organizations, as a rule, carry out the virgin development of the territory under construction with their own forces.

In light of the fact that mobile organizations are given a number of privileges and incentives in the workers' wages it would be expedient to establish the conditions for considering construction and installation organizations as being mobile. The requirement of having no less than 50 percent of the amount of construction and installation work that is done by their own forces take place at projects that are located outside of areas where workers permanently live and where rear construction industry support bases are located at distances that do not make it possible to provide the daily transportation of workers from their permanent living areas to the projects under construction and back could, in particular, serve as such a condition. At the present time this indicator is significantly lower in a number of construction and installation organizations that have mobile status which lowers the overall magnitude of the economic effect that is possible from their activity.

It should be noted that, in addition to redeploying construction and installation administrations as a whole, in a number of cases a maneuver is carried out with available capacities at the level of individual sections that also aids in completing the work that is assigned to the mobile organizations. The activity of mobile construction and installation organizations aids in reducing construction time and the time that it takes to put structures and capacities into operation, in accelerating the formation of the necessary production and social infrastructure in newly developed regions, in improving the interregional use of highly qualified construction personnel, and in improving the level of specialization in construction organizations. The specific features of mobile construction organizations are:

the great distance of the structures they are erecting from the production base, a great dispersion and in many cases a great linear length in the structures being erected;

the necessity of providing mobile elements of a production and social infrastructure of a basic and auxiliary nature with the aim of creating

the necessary everyday conditions and capacities for effectively carrying out their production activities;

doing a significant amount of work at the virgin stage of development in undeveloped and difficult to reach regions of the country;

using the watch, expedition-watch and expedition methods of organizing labor, complete modular and other advanced methods of producing work aimed at saving labor expenditures in every way possible in areas where construction and installation production work is being done;

a relative growth in the expenses of construction organizations brought about by the mobile nature of the production activity;

the necessity, in certain instances, of increasing the autonomy of low-level subdivisions (SUs [construction administrations] and sections) caused by doing work at projects at considerable distances from the areas that administrative agencies of trusts have been deployed.

The operations of mobile construction and installation organizations in practice has shown the effectiveness of using this organizational form of managing construction. The operations of the VSMO [probably--All-Union Construction and Installation Organizations] in the Union of Special Heavy Construction in building a compressor station in the suburb of Dolgoye in Orel Oblast for the Urengoy-Pomary-Uzhgorod main pipeline can serve as an example of the rapid concentration of capacities of mobile construction and organizations. In order to achieve this goal one mobile construction administration and six sections under the jurisdiction of other mobile organizations, about 400 workers, more than 150 pieces of construction machinery and mechanisms and a large quantity of storage facilities for production and housing purposes were redeployed in a short period of time to the region under construction at a distance ranging from 260 to 1830 kilometers. The preparatory period in the given instance was kept to a minimum. In association with the fact that the USSR Ministry of Construction of Heavy Industry Enterprises did not have stationary construction organizations under their jurisdiction directly in the construction region the function of general contractor was assigned to the mobile Spetsfundamenttyazhstroy [Special Foundation and Heavy Construction] Trust located in Lipetsk at a distance of 260 kilometers from the construction site. Earthwork, laying utility lines, finish and other types of work that correspond to the job description of the VSMO in the Union of Special and Heavy Construction is being completed by its subdivisions. The installation of metal components and technological equipment was assigned to organizations in the USSR Ministry of Installation and Special Construction. A starting complex administration was formed to manage this construction project headed by the chief engineer in the Spetsfundamenttyazhstroy Trust with deputies appointed by representatives of the USSR Ministry of Installation and Special Construction and the client. During construction of the compressor station the watch method was used with a change in the watch twice a month. In order to successfully complete construction of the project the entire amount of work was divided into 15 sections and assigned to specific performers of the work.

The total amount of construction and installation work for 1983 and 1984 exceeds 12 million rubles of which more than 10.7 million rubles is to be completed by the forces of mobile organizations of the VSMO in the Union of Special Heavy Construction.

Organizing the construction of the Astrakhan GPZ [gas processing plant] and developing the Astrakhan gas condensate deposits can serve as another characteristic example of quickly concentrating capacities to build important national economic projects. These very large deposits should already be developed in 1984 to 1986. The importance and magnitude of the work on the entire complex is evident from the fact that among the clients are six of the largest union ministries and the function of general contractor has been assigned to the USSR Ministy of Construction of Petroleum and Gas Industry Enterprises, the USSR Ministry of Industrial Construction, the USSR Ministry of Transport Construction and the USSR Ministry of Land Reclamation and Water Resources.

The Astrakhan'promgazstroy Production Construction and Installation Association was formed in 1981 as part of the VSMO in the Union of Special Industrial Construction and given the function of general contractor with the aim of completing work at consolidated projects. In addition, the Soyuzpromstroy Trust was formed as part of the VSMO in the Union of Special Industrial Construction in 1983 located in the suburb of Kiri-Kili in Astrakhan Oblast for production work in developing the projects at the Astrakhan gas condensate deposits in the undeveloped desert regions in the oblast. From the first year that this trust was functioning a volume of general contractor work was assigned that amounted to 10,171,000 rubles including 2,217,000 rubles to be completed by their own forces. Despite the fact that the trust had not been allocated the complete required amount of machines and mechanisms on time the plan for general contractor work for the first half of the year was completed at a rate of 131.9 percent and the plan for its own forces at the rate of 221.4 percent.

Except for newly formed production subdivisions the VSMO in the Union of Special Industrial Construction preceded a number of mobile construction and installation administrations and sections under the jurisdiction of mobile construction and installation trusts into the construction region. For example, subdivisions of the Tsentropromekskavatsiya were redeployed in the construction region. Already by 1982 their forces had completed work amounting to 9,344,000 rubles while in 1983 the relative proportion of the work completed in developing the Astrakhan deposits amounted to more than 60 percent of the trust's total production program. In 1982 more than 68 percent of the time workers spent on the job was on watch. Bonuses above regular wages in the form of compensations for round-the-clock work and field trips compensation or trips amounted to about 14 percent of the estimated wages; in 1983 56 percent of work time was spent on trips and bonus above regular wages amounted to more than 12 percent.

The subdivisions of all the mobile trusts that were enlisted operate at distances between 500 and 2000 kilometers from the support bases of the construction administrations.

In the next few years the amount of work will increase which will require a further concentration of the capacities of mobile construction and installation organizations in the VSMO of the Union of Special Industrial Construction in Astrakhan Oblast. The amount of work done for the VSMO as a whole to develop the gas condensate deposits grew from 0.4 million rubles in 1981 to 70 or more million rubles in 1983. In 1984 the volume of work will increase to 102 million rubles.

The overall plan for gearing up work takes the following form. One section in the Tsentropromekskavatsiya Trust was redeployed to the suburb of Aksaraysk at the end of 1981 and the necessary preparatory work was completed. Mobile construction organizations and sections from four mobile trust associations worked in this region in 1982 and in 1983 another two mobile trusts were enlisted in the construction.

There are a number of serious difficulties in the work of mobile construction and installation organizations caused by the specific nature of their activity and the insufficiently perfect economic mechanism. The transition of mobile organizations to operate on the watch method practically always leads to a high turnover of workers despite a number of privileges and incentives. For example, more than 50 percent of the workers were discharged during the transition to the watch system for organizing labor during construction of the compressor station in the suburb of Dolgoye. Even greater losses occur when the mobile construction organization is redeployed as a unit. This generally conforms to principle since redeployment of an organization is associated with a change in the place of residence and the conditions to which, not only the workers in the construction organization but also their families, have become accustomed. However, providing the necessary living, everyday, social and cultural conditions reinforced by additional material and moral incentives and privileges makes it possible to substantially reduce the percentage of turnover in personnel. For example, in our view it is necessary to conclude a special labor agreement with the workers in mobile organizations which would stipulate that the administration has the right to transfer workers to the watch and expedition method of organizing work when the production need arises while during the same period that the workers are on watch they would aquire the right of increase privileges and incentives for working under field conditions. This provision could specifically be stipulated in a collective agreement.

In our view it is necessary to implement the following measures in the area of increasing the material and moral incentives for workers in mobile organizations:

introduce inceased bonuses above wages for lengthy service in a mobile construction and installation organization and monetary compensation for years of service to be expanded to all categories of workers;

establish a privilege system of calculating seniority by years of service (using a higher coefficient for the time spent on watch or on trips to the locations where the work is being done) for workers on the watch, expedition and expedition-watch methods;

increase the wage scale and salaries of workers for the period that they are on watch or on trips to the locations where the work is being done;

increase the level at which workers in mobile construction and installation organizations and their families are provided with housing, accommodations in children's preschool institutions, and trips to sanitoriums and rest homes. Provide special arrangements for children in kindergartens and nurseries in the areas that the units are being redeployed or in nearby populated areas in the event that workers in construction organizations and their families leave to go to locations where the work is being done;

permit mobile organizations to use a portion of the funds for social and cultural measures and housing construction to organize the free feeding of workers while they are on watch.

The redeployment of mobile construction and installation organizations causes a certain amount of lost work time which, with the proper organization of work and coordination by the general contractor and the transportation organization, can be significantly reduced. The primary reasons for loss of work time, as an analysis that was done has shown, are: an insufficient number of trailers (especially those with a large load capacity) and powerful tractors for transporting technology and goods; the existing limitations in organizing the transportation of heavy technology through populated areas by motor vehicle transport and also railroad transport, and lengthy application procedures for permission to transport technology in cities; incomplete and late supplies of the required number of railroad cars and platforms when transporting by rail; the necessity of returning to the same site several times due to the general contractor providing a work access area that is not complete or on time.

In order to reduce such losses of time it is necessary to take the following measures: have the general contractors and cooperating organizations draw up interdependent work production and redeployment schedules and strictly observe them; simplify the sytem of issuing permits for GAI [the State Motor Vehicle Inspectorate] agencies to transport mobile construction and installation organizations' goods; during redeployment it is necessary to calculate the exact personal composition and structure of the fleet of construction machinery and mechanisms avoiding, if possible, moving capacities beyond the boundaries of climate zones (for example from the middle region of the country to the far north) which results in the need for a long adaptation time for workers and reduces the operational efficiency of mechanisms and the construction organization as a whole.

In order to improve the economic mechanism of mobile organizations it seems necessary to work out and approve the following standard documents:

a system to calculate expenditures in the estimates for construction organizations to become mobile and for clients to compensate them;

standards for time expenditures to redeploy mobile construction organizations and their production subdivisions depending on the distance in relocating the base and the amount of capacities that must be redeployed;

standards for amortization deductions for mobile construction organizations keeping in mind the increased physical wear and tear on technology;

increased standards in supplying mobile construction organizations with spare parts;

tables for supplying mobile organizations with construction technology, equipment, and storage (movable) buildings and structures;

typical statutes for a mobile construction and installation organization that would regulate the primary facets of its activities.

The problem of increasing the mobility of construction organizations is exceptionally urgent at the present stage and therefore it requires study from all angles and, on the basis of this, specific measures must be worked out to create the necessary conditions for improving the effectiveness of the activities of mobile organizations and the mobility of construction as a whole.

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USE OF CONTAINERS IN TRANSPORTING COMPONENTS ADVOCATED

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[Article by S. P. Yepifanov, candidate of technical science and D. M. Zlatopol'ski, engineer in TsNIIOMTP [Central Scientific Research Institute for the Organization, Mechanization and Technical Assistance of Construction] in USSR Gosstroy: "New Technology for Supplying Precast Reinforced Concrete Components in Multi-ton Containers Using Self-Discharging Motor Vehicle Means of Transportation]"

[Text] Under conditions where the volume of housng construction is continually expanding in the USSR and the relative proportion of completely prefabricated housing units is growing, the role and importance of the process of delivering prefabricated building components from the place that they are manufactured to the construction sites and the demands for its efficiency are growing. Along with this, as experience shows, the existing delivery methods (from unloading at a warehouse, installation from the vehicle and others) contain a number of deficiencies that lower the technical and economic indicators for transport and for the entire construction and installation process. For example, when delivering components by transfering them to a warehouse at the site expenditures for loading and unloading work increase while using the installation crane for unloading slows the pace of installation work and leads to an increase in the duration of erecting a building. Expenses are also required for equipment and for operating the components warehouse at the site.

The above mentioned deficiencies are eliminated with installation from the vehicle with which there is no transfer of components that have been delivered to the site. However, with such a method of operating a very precise coordination of the operations of the means of transportation and the installation crews is required since in the event that the means of transportation are late at the moment that the preceding installation cycle ends, the tower crane and installation crews will stop work due to a lack of components to install. And vice versa, a deviation in the flow of installation work from the schedule leads to idle time for transportation. In association with the fact that both the transportation and installation process are affected by various random factors, and also taking into consideration the extensive list of components that are delivered, the installation time for which fluctuates within considerable limits, it is not possible to achieve synchronized transportation operations and flow of

installation work as experience has shown. The lengthy idle time of motor vehicle means of transportation at construction sites (during the course of installing all the delivered components) is also a deficiency of installing from motor vehicles.

When unloading components at the site warehouse and also when installing from a motor vehicle the dependence of the means of transportation on the hoisting mechanisms at the manufacturing plant and at the construction site does not make it possible to increase the operating time of transportation in a 24-hour period and the coefficient of its use during a shift is also reduced.

In order to deliver products by the shuttle system, which is possible in the event that motor vehicle means of transportation are equipped with supporting devices having a hydraulic drive, special preparation of the foundation of finished products warehouses at the manufacturing plant and the construction site warehouses is required (placing concrete, laying slabs, etc.) as well as a large area at these places for parking semi-trailers and maneuvering a tractor trailer. The latter requirement is not always feasible when considering crowded warehouse and construction site conditions. The delivery of such products as lavatory sections, ventilation modules, elevator shaft components and others is not possible by the shuttle method since the components being delivered are not installed in succession and it takes a long time to free a semi-trailer. The delivery of such components, the relative proportion of which reaches to 20 percent in buildings, can only be done by transfering them to a warehouse at the site.

The delivery of prefabricated components to sites by the shuttle method during a period when the tower crane is not operating is possible in principle; however, a large amount of semi-trailers is required for this as well as a large area at the loading and construction sites. The fact should also be noted that lengthy idle time of unattached semi-trailers at the warehouse and at the construction site also leads to a decline in the technical status.

An efficient method of delivering prefabricated components is to transport them in multi-ton containers on motor vehicle means of transportation that are equipped with independent devices for loading and unloading containers. When operating by such a method, the driver of the motor vehicle means of transportation, having delivered a container with components to the construction site, unloads the container with the aid of the loading and unloading device on the semi-trailer and then sets an empty container on the means of transportation that had been delivered and unloaded earlier. A similar exchange of the empty container for a loaded one that is prepared in advance for shipment is also made at the prefabricated components manufacturing plant. There is no transfer of components to a site warehouse, i.e. the tower crane performs only the installation of the prefabricated components that are delivered complete in the required sequence.

The means of transportation are located at the construction site and at the shipping point only for the time required to remove and set the container and to fill out documents. The fact that the means of transportation do not depend on a tower crane for unloading makes it possible to make deliveries

during the period when the crane is not operating (during the night etc.), i.e. to increase the operating time of transportation during a 24-hour period and also to increase the level at which it is utilized during a shift. All of this leads to an improvement in the productivity of motor vehicle means of transportation and to a reduction in the amount required. The possibility of forming a reserve of components in the form of loaded containers after several subsequent complete deliveries eliminates the idle time of tower cranes and installation crews. The need for equipment for a prefabricated components warehouse at the site, etc. is completely eliminated.

As calculations that have been made show, the annual economic effect from the use of container deliveries of prefabricated components amounts to about 40,000 rubles for each means of transportation while the cost per 1 square meter of living space is reduced by 2 to 2.5 rubles.

The TsNIIOMTP in USSR Gosstroy is working out a series of problems associated with adopting the new technology for delivering prefabricated elements for housing units. Technical documentation is being prepared on the semi-trailer with the loading and unloading devices and containers for transporting various types of products for which experimental models have already been made. It is a loading and unloading crane-type device with a hydraulic drive. Unloading the container is accomplished to ground level from the side of the semi-trailer. The laod capacity of the semi-trailer is 20 tons. The length of the transported components may be up to 7.2 meters. Loading and unloading of containers is accomplished in 10 minutes. In addition, the problems of organizing complete deliveries at the precast component manufacturing plant, their transportation and delivery to construction sites are solved. A method of determining the required number of transportation means and containers depending on the capacity of the housing construction combine and other factors is suggested.

The experimental adoption of the new method of delivering prefabricated components will be implemented in 1984 at a number of projects being done by the USSR Ministry of Construction of Heavy Industry Enterprises and the USSR Ministry of Construction.

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